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ADDRESSES AND ORIGINAL ARTICLES

THE INCIDENCE, MORTALITY, AND TREATMENT OF HÆMORRHAGE IN GASTRIC AND DUODENAL ULCER

By Arthur F. Hurst, D.M. Oxon., F.R.C.P. Lond.
SENIOR PHYSICIAN TO GUY'S HOSPITAL, LONDON; AND

J. A. Ryle, M.D., F.R.C.P. Lond.
CONSULTING PHYSICIAN TO GUY'S HOSPITAL AND REGIUS PROFESSOR OF PHYSIC IN THE UNIVERSITY OF CAMBRIDGE

In spite of advancing knowledge in the fields of diagnosis and pathology we have evidence that peptic ulcer and its complications are becoming more rather than less frequent (Wilkie, 1927; Ryle, 1932). Of the complications hæmorrhage is the commonest, occurring at one time or another in approximately a third of all cases (Table I.). If we except perforation, it is also the most disturbing complication. For these reasons, but also because new measures of active treatment (Gordon-Taylor, 1935; Meulengracht, 1935) have recently been advocated, the whole subject of bleeding peptic ulcer may be considered ripe for review.

Judgment in the face of a severe gastric or duodenal hæmorrhage must find its basis in pathological insight, a sound knowledge of prognostic criteria, and a just appreciation of therapeutic possibilities, whether medical or surgical. In the matter of the relative claims of medicine and surgery in the treatment of chronic ulcers uncomplicated by hæmorrhage we have always endeavoured to maintain a just balance of opinion. For actively or recently bleeding ulcers we have almost always concluded in favour of medical treatment. Although we have retraced our steps for the purposes of this communication, we see no reason to feel regret for past decisions. Our reasons for conservatism, backed by an analysis of our experience, will follow, but by way of introduction and as a reminder of practical difficulties two cases are described.

The first case, the only one in which J. A. R. has ever invited the coöperation of a surgical colleague, was that of a man just past middle life who was known, from clinical and X ray evidence, to have a large ulcer on the lesser curvature, who started to bleed profusely shortly after admission to hospital, and whose hæmoglobin fell to 18 per cent. on more than one occasion, transfusions of blood and the usual routine treatment notwithstanding. The surgeon declined to operate and the patient made a complete recovery, eventually losing his ulcer deformity.

The second case was one of grave hæmorrhage, also in a middle-aged man. In this case medical treatment had been instituted with a completely satisfactory response, but, in spite of reasoned protests, the patient was taken out of the hands of his doctor and J. A. R. and operated upon. No trace of an ulcer was found.

These two cases exemplify three outstanding difficulties: (1) the difficulty of giving a prognosis even when we know something of the nature, site, and size of the lesion, and can gauge the amount and continuance of the blood loss; (2) the difficulty of refraining from active interference because we possess this knowledge and because we are anxious; and (3) the difficulty in many instances of being sure whether there is a demonstrable ulcer present at all.

In the first case, even if surgery after transfusion could have saved the patient's life, it would have been a wrong decision, for it would have added an undeniable risk, the necessity for which was disproved by the subsequent event. In the second case a quite unnecessary risk was actually taken with no benefit to the patient.

In a given case of sudden gastric or duodenal hæmorrhage, having excluded such other causes as hepatic cirrhosis, splenic anæmia, cancer, and the hæmorrhagic diathesis, we are usually entitled to make a diagnosis of peptic ulcer, the commonest cause of bleeding from these sites. In many cases we can, on the basis of history, hazard a reasonable guess as to whether the bleeding comes from a recent or acute ulcer, or from an old or chronic one. Experience tells us that death very rarely results from recent ulcers, that is to say, in young subjects, or in cases lacking a dyspeptic history. Experience also tells us that in the great majority of cases of bleeding from chronic ulcers the immediate prognosis is good, however severe the bleeding. There are, however, wide discrepancies in the mortality figures reported in the literature, and, as it is largely upon a just estimate of risks that our choice between conservative treatment and more active forms of intervention must be based, a new and careful study of prognosis must be allowed to precede all other considerations.

In a long experience of post-mortem work we can recall only a small series of peptic ulcers fatal through bleeding. In most of these there was a large, posterior, and often adherent ulcer with a big vessel opened in its base, a type of lesion which must provide considerable difficulties for the surgeon even in an otherwise fit patient. In the course of preparing a Hunterian lecture on duodenal ulcer in 1932, J. A. R. found only 25 deaths from hæmorrhage from duodenal ulcer during twenty years at Guy's Hospital as compared with 128 deaths from other complications and sequels of this lesion. In our private practice we have never seen reason to adopt a pessimistic attitude in the presence of these hæmorrhages, and we find that most physicians of wide experience share this opinion.

Incidence of Hæmorrhage in Chronic Ulcer

A full history was obtained from all the 586 cases of ulcer investigated in New Lodge Clinic between February, 1921, and February, 1936, and from the 754 cases seen in private practice by J. A. R. from 1920 to 1935, so that the two groups form a fairly reliable basis for estimating the incidence of hæmorrhage. The figures obtained, though lower than those given by most observers, are still probably too high, as cases with mild or trivial symptoms are not likely to be sent to the Clinic or to be seen in

TABLE I

Incidence of Hæmorrhage in Duodenal, Gastric, and Post-operative Ulcers. (A. F. H. and J. A. R.: private cases)

—	Total.	Number with hæmorrhage.	Percentage with hæmorrhage.
Gastric ulcer ..	241	79	32·7
Duodenal ulcer ..	942	268	28·4
Post-operative ulcer	157	72	46·3
Total.. ..	1340	419	31·3

consultation, so that the proportion with severe and serious symptoms, such as hæmorrhage, is likely to be excessive.

Table I. gives the percentage of gastric, duodenal, and anastomotic ulcer with hæmorrhage.

Mortality of Hæmorrhage from Ulcer

The true mortality of gastric and duodenal hæmorrhage could be ascertained only by accurate statistics collected by general practitioners. Hospital statistics are erroneous, as only the more serious cases are likely to be sent to hospital, and their seriousness is often greatly increased by the excitement and activity involved in their transference from home tc hospital ; preceding ill-health and inadequate early treatment would further tend to increase the mortality. Physicians and surgeons are also likely to see only the more serious cases in consultation.

GENERAL PRACTICE

Unfortunately general practitioners rarely have sufficient leisure or assistance to keep records from which accurate statistics can be obtained. But a death from hæmorrhage is such a dramatic event that it is not likely to be forgotten, so that the number of deaths given by practitioners can be accepted as correct, even if the total number of cases of hæmorrhage seen can be only roughly estimated by those who have been more than a few years in practice. We find on inquiry that the incidence of new cases of hæmorrhage in most large general practices is between 1·5 and 2 per annum. Twenty-seven general practitioners, two of whom practise in London, nine in large towns, and the others in small towns and country districts, who have together been in practice for an average of nineteen years, have seen in all about 677 patients with hæmatemesis and melæna from ulcer. Of these only 9 have died ; these include the only 3 among the 677 who underwent operation. This gives a mortality of 1·31 per cent. If we make the more than ample allowance of 100 per cent. for possible exaggeration in the number of cases seen, we still have a mortality of only 2·6 per cent.

HOSPITAL STATISTICS

The following statistics were obtained by Dr. A. M. Babey from an analysis of all cases of ulcer admitted under the care of A. F. H. from the time he took charge of beds in Addison and Mary wards at Guy's Hospital late in 1919 to the end of 1935. All of the cases included as "hæmorrhage on admission" had had bleeding sufficiently severe to necessitate admission to hospital, and all of them bled very shortly before entry to the wards, only 3 having bled as long as forty-eight hours before.

During the years 1919–35 inclusive there were 371 cases of chronic gastric, duodenal, and anastomotic ulcer admitted. Of these 82, or 22 per cent., had bled within forty-eight hours of admission ; in 32 of the 82, or 39 per cent., there was a history of an earlier hæmorrhage, which in many cases was several years before, in one case twenty years before, admission. In 106 of the total 371, or 29 per cent., a previous hæmorrhage was recalled. This figure is too low, for of the 371 case records 50 were incomplete. Of the 82 cases admitted for hæmorrhage 54 had gastric ulcers (66 per cent.), 22 duodenal ulcers (26 per cent.), and 6 anastomotic ulcer (8 per cent.). As there were 191 gastric ulcers, 167 duodenal ulcers, and 10 gastro-jejunal ulcers in the series (in addition to 3 with both gastric and duodenal ulcers), the proportion of cases admitted for hæmorrhage in gastric ulcer was 27 per cent., in duodenal ulcer 13 per cent., and in anastomotic ulcer 60 per cent.

In 4 cases death was directly attributable to hæmorrhage. The mortality-rate for the whole group of cases admitted for hæmorrhage is therefore 4 in 82, or 4·8 per cent. In the first of the fatal cases glands suggestive of carcinoma were found post mortem, but unfortunately the microscopical report is lost. If the ulcer was malignant, the mortality from hæmorrhage from simple ulcer would be reduced to 3 in 82, or 3·6 per cent. The mortality-rate from hæmorrhage of patients admitted for hæmorrhage (82) or with a history of one or more hæmorrhages is 4 out of 156, or 2·5 per cent. ; for reasons given above this percentage is certainly too high. The mortality from hæmorrhage of all cases of ulcer, including those which have never bled, is 4 out of 371, or 1·1 per cent.

From the histories of the patients who died and their autopsy findings it would appear that Cases 1 and 4 might possibly have been saved by surgery.

CASE 1.—Female, 53, admitted for three successive hæmorrhages just before entry. She gave a history of hæmorrhage one year ago. The day after admission there was a small hæmatemesis. Three weeks later four hæmorrhages occurred and she died the next day. "A huge gastric ulcer was found, with a large gaping artery at its base. . . . Glands were present suggestive of carcinoma."

CASE 2.—Male, 48, gave a history of a severe hæmorrhage eighteen months before. Two days after coming into hospital he had a severe hæmorrhage. The following day he had another severe hæmatemesis and died soon afterwards. "On the lesser curvature slightly nearer the pylorus than the cardia was a large saddle-backed ulcer with smooth base and raised sharply defined edges. The ends of two small arteries lightly plugged with clot were visible in its base. It was firmly adherent to the pancreas at about its middle, which was converted into a fibrous sac containing the somewhat dilated and reddened pancreatic duct. The pancreas was indurated."

CASE 3.—Male, 29, admitted for hæmatemesis Nov. 18th, 1930. He had other severe hæmorrhages in the ward for which repeated transfusions were given, but he died Dec. 22nd. "A perforation which would admit the tip of the little finger was seen on the anterior surface of the first part of the duodenum. It was shut off from the abdominal cavity by the transverse colon which acted as a roof. A considerable amount of blood tracked from the perforation backwards into the lesser sac, which contained one or two ounces of blood-clot. Almost the entire circumference of the duodenum was occupied by a chronic ulcer, measuring 1 in by ¾ in., surrounded by overhanging and thickened fibrous edges. On the floor of the ulcer a vessel had been completely divided so that the mouth of the proximal and distal ends were both gaping. On cutting through the floor of the ulcer at least 4 mm. of white scar tissue was encountered and was found to be adherent to the pancreas."

CASE 4.—Male, 43, admitted for severe hæmatemesis nine hours previously. Two large hæmorrhages occurred in the ward. Three transfusions were given, but the patient died nine days after entry. A large eroded vessel was found at the base of an acute gastric ulcer on the lesser curvature.

ANALYSIS OF CASES SEEN IN CONSULTING MEDICAL PRACTICE (J. A. R.)

The cases which I see in consulting practice include patients from various classes, excepting only the poorest class. In a considerable proportion of my private cases I have been called in during an active hæmorrhage. Others have been referred to me soon after their recovery from such a hæmorrhage. Others again have been seen for dyspeptic symptoms, but a clear account of one or more hæmorrhages has been

obtained and entered in my notes. Very few have suffered the disadvantage of transportation while bleeding. The great majority were promptly diagnosed and treated. Only a very small minority were given transfusions of blood. All had definite melæna or red hæmatemesis at intervals of months or years. Many patients had recurrent hæmorrhages.

In my analysis (Tables II. and III.) I have divided the hæmorrhages into "severe" and "slight." Some of the "slight" cases could probably, with reason, have been transferred to the "severe" group. The cases which were classified as "severe" were definitely described as such, or were in bed for a period of weeks, or were recorded as having hæmoglobin figures of 50 per cent. or lower. The duodenal and gastric ulcers and the anastomotic, including other post-operative ulcers, were at first separately considered, but only the collective figures are here given. One untraced case of bleeding peptic ulcer is included, for the purpose of this analysis, among the fatalities.

TABLE II

Incidence of Hæmorrhage in Duodenal, Gastric, and Post-operative Ulcers (J. A. R.'s series)

(*a*) Total cases: D.U., 563; G.U., 131; post-op. U., 60	754
(*b*) Total cases with hæmorrhage (severe and slight) ..	258
(*c*) Total cases with severe hæmorrhage..	128
(*d*) Total hæmorrhages in 258 cases with hæmorrhage	390
(*e*) Total severe hæmorrhages in 128 cases with severe hæmorrhage	153
(*f*) Total deaths from hæmorrhage (complicated and uncomplicated)	10
(*g*) Total deaths from hæmorrhage uncomplicated by old age or by other illness which would have prohibited surgery	4

TABLE III

Mortality from Uncomplicated Hæmorrhage (J. A. R.'s series)

	Per cent.
(*a*) Mortality from uncomplicated hæmorrhage in ulcer (754 cases)	0·5
(*b*) Mortality from uncomplicated hæmorrhage in cases of ulcer with hæmorrhage (258 cases)	1·6
(*c*) Mortality from uncomplicated hæmorrhage in cases of ulcer with severe hæmorrhage (128 cases) ..	3·1
(*d*) Mortality from uncomplicated hæmorrhage in all hæmorrhages (390 cases)	1·0
(*e*) Mortality from uncomplicated hæmorrhage in all severe hæmorrhages (153 cases)	2·6

There were no deaths from hæmorrhage among women with duodenal ulcer. Duodenal ulcer was five times as common in men as in women in this series. Of the fatal hæmorrhages from gastric ulcer 2 were in men, 2 in women.

There were no deaths from hæmorrhage among the cases of anastomotic ulcer.

The ages in the fatal cases of uncomplicated hæmorrhage were 55, 50, 36, and 26.

The ages in the six fatal cases complicated by old age or other illness were 86, 72, 67, 60, 56, 52. The complicating illnesses in the last four of these were gastric uræmia, heart failure, cellulitis of the arm, and aortic disease respectively.

Analysing the four fatalities from uncomplicated hæmorrhage we find that the youngest, aged 26, a case of duodenal ulcer confirmed radiologically, was referred to me with an eighteen months' history of severe epigastric pain with radiation through to the back, suggesting a posterior ulcer involving the pancreas. He went home for treatment and a few days later succumbed to an enormous hæmorrhage. A gastric surgeon of wide experience declined to operate.

The second patient, aged 36, had a history of ulcer-dyspepsia going back at least six years. I was called to see him in an exsanguinated and emaciated condition ten days after a severe hæmatemesis. Melæna had continued. The pulse-rate was 120. He died immediately after a blood transfusion.

The third patient was aged 55. He had had symptoms of a gastric ulcer for several years. He was seen and admitted to hospital after a severe hæmorrhage, and died in spite of routine treatment and a blood transfusion.

The fourth case, aged 50, was not traced, her doctor having left the country. For purposes of the analysis this case has been counted as a fatality.

The suggestion that subsequent bleedings are more serious than a first bleeding is not supported by this series. The 4 fatal uncomplicated hæmorrhages were all first hæmorrhages. This agrees with Crohn's statistics concerning 101 cases of severe hæmorrhage from ulcer at Mount Sinai Hospital; there was no previous hæmorrhage in any one of the 9 fatal cases, 4 under medical treatment and 5 after operation.

The number of subsequent hæmorrhages in individual non-fatal cases varied from 1 to 9. The numerical excess of total hæmorrhages over the cases with hæmorrhage was 132. The excess of total severe hæmorrhages over the cases with severe hæmorrhage was 25.

Surgery for Hæmorrhage from Ulcer (A. F. H.)

There have been 586 cases of ulcer (110 gastric, 379 duodenal, and 97 anastomotic) in New Lodge Clinic between February, 1921, and February, 1936, and in 3 of these, all duodenal, the patient has died from hæmorrhage. They were the only cases recognised as being unlikely to recover with medical treatment, and they were therefore the only ones which were operated upon whilst still bleeding. But surgery failed to save them, not because their condition was too serious at the time of the operation, for in each case transfusion had raised their hæmoglobin to a safe level, but because the three surgeons concerned, all very experienced, very competent, and very courageous, had to content themselves with indirect operations, as they could not excise the ulcer on account of the adhesions and friable character of the inflamed tissues.

In the first patient, a man of 55, a very large ulcer was found on the upper and posterior wall of the duodenum, half an inch from the pylorus, invading the pancreas. The gastroduodenal and right gastro-epiploic arteries were tied, the ulcer was invaginated with catgut sutures, and a gastrojejunostomy was performed. The hæmorrhage, however, continued and in spite of two further transfusions he died the following day.

The second case, that of a man of 39, was an example of familial duodenal ulcer, one brother having died from perforation of a jejunal ulcer and another from duodenal hæmorrhage. The patient himself had had three operations for ulcer before the final one which preceded his death. A gastrojejunostomy was performed in 1916 for a duodenal ulcer, which had been present for a year; in 1925 a callous gastrojejunal ulcer was excised and a new gastrojejunostomy performed; subsequently a jejunal ulcer, which had almost perforated into the transverse colon was excised and the normal anatomy restored. In 1928 a new duodenal ulcer developed, which soon led to pyloric obstruction and serious hæmorrhage. The patient died in spite of partial gastrectomy with duodenal exclusion and infolding of the ulcer. The surgeon wrote to me: "I am very glad that I did not go on any further and deal with the mass in the neighbourhood of the first part of his duodenum. I should certainly have slain him on the table."

The third patient, a man of 37, had had symptoms of duodenal ulcer since he was a boy. He had five very severe hæmatemeses in the last five years, the third a month before admission. He was admitted on Sept. 3rd, 1935. From that time he had almost daily hæmorrhages, his hæmoglobin dropping from 92 per cent. on Sept. 4th to 32 per cent. on the 16th. As the hæmorrhage continued in spite of treatment, an operation was performed on Oct. 6th after three transfusions, which raised his hæmoglobin to 68 per cent. His urine was normal

and his systolic blood pressure 150 mm., but his blood-urea varied between 54 and 86 mg. per 100 c.cm., although he was given no alkalis. After the separation of a large mass of dense adhesions the duodenum was found to be much scarred and acutely inflamed over its whole circumference. It was obvious that excision was impossible and that the bleeding point could not be dealt with directly, as the incision would have had to cross the ulcer. A partial gastrectomy with duodenal exclusion was therefore performed. He continued to bleed, and in spite of further transfusions his hæmoglobin fell to 28 per cent. and his blood-urea rose to 432 mg. per 100 c.cm. on the day of his death (Oct. 11th).

Post mortem an enormous single ulcer was found occupying the entire circumference of the duodenum except for about 1 cm. on the lesser curvature. The gastro-duodenal artery with a hole in its centre was exposed in the centre of the ulcer. The base of the ulcer was adherent to both the inferior vena cava and the common bile-duct, so that neither excision nor ligature of the exposed artery would have been possible. It was clear too that neither medical treatment nor any indirect operation could have saved him.

Of the many cases of severe hæmorrhage from ulcer seen by A. F. H. among private patients before the war, in 1919 and 1920, and outside New Lodge Clinic since 1920 only one died from hæmorrhage—a patient whose fatal hæmorrhage in 1914 followed immediately after a gastrojejunostomy for a duodenal ulcer which had never bled before. An operation was advised on account of hæmorrhage in only one of these cases, seen in 1913.

The patient, a man of 60, with severe arterio-sclerosis, was urged to have a gastrojejunostomy performed when he was seen for the first time some months before his hæmorrhage, as he had a very long history of duodenal ulcer, which had led to severe pyloric obstruction. He refused to submit to surgery, and continued to wash his stomach out two or three times a day as he had done for many years. Three months later he had a severe hæmorrhage, which was repeated at the end of a week's starvation, when he was seen for the second time. An immediate operation was advised. The next morning Lord Moynihan found an enormous duodenal ulcer producing pyloric obstruction; he performed a gastrojejunostomy and cut off the blood-supply to the ulcer by overlapping sutures round it. The patient did very well; he died four years later from pneumonia without having had any recurrence of gastric symptoms.

The alarm engendered by the appearance and circumstances of a grave internal hæmorrhage, improved surgical preparation and technique, and subservience to the idea that an attempt should be made to control bleeding mechanically at its seat of origin, have between them been allowed to constitute a plea for bolder and more drastic action. We hope that we have shown that, while such action may indeed be dramatic and is certainly courageous, and while it may frequently achieve success in skilful hands, it can only in very exceptional circumstances be regarded as judicious. In less experienced hands we fear that it will immediately increase the mortality from this accident.

General Treatment

Of conservative treatment, which is not always accorded the detailed attention which it deserves, the following summary should suffice. When local conditions are favourable, it should be carried out without transportation of the patient. When transportation is essential, the optimum moment should be chosen for it and the completest possible comfort and immobilisation should be secured for the patient, who must be kept warm and recumbent. In all cases a quarter of a grain of morphia should be given at once hypodermically and repeated at intervals, judiciously and in accordance with the needs of the case, during the first 24–48 hours. This and watchful nursing are the most important prescriptions. All mouth-feeding should be forbidden for 24 or 48 and in rare cases 72 hours. Longer starvation in severe cases is unwise. In slight cases it is unnecessary. A closer study of the advantages of earlier and more liberal mouth-feeding in severe hæmorrhage is needed. The mouth may be rinsed, but at first not even water should be swallowed. Normal saline solution, from half to three-quarters of a pint, slowly administered by rectum, should be given four-hourly. By raising the foot of the bed on a block the pressure in the rectum is reduced and the fluid is more easily retained.

It is rarely necessary to give any treatment for the constipation which occurs as a result of the starvation and administration of morphia, as the bowels generally open on the third day after one of the injections of saline solution.

Injections of proprietary hæmoplastic sera are of no value, and the claim that they encourage coagulation has not been substantiated (Christie and Gulland).

The hygiene of the mouth must be attended to, for the risk of parotitis in the more serious cases is considerable.

When the anxious earlier phase has passed, medical treatment as for an uncomplicated ulcer is gradually instituted. Investigation with X rays and test-meal should be postponed until the patient's general condition and hæmoglobin percentage justify movement. This means waiting for three or four weeks, by which time it is often found, especially with gastric ulcers, that no abnormality can be discovered with the X rays. This appears to be due to acceleration in the healing of an ulcer after a hæmorrhage, a belief which receives confirmation from the rapid disappearance of occult blood from the stools. Chemical and spectroscopic tests in the majority of cases become negative at an earlier date after the beginning of treatment if a gross hæmorrhage has occurred than in cases in which there has been no obvious hæmatemesis or melæna.

Transfusion

We are inclined to think that transfusion is not without danger, a conclusion also reached by Cullinan and Price in their study of cases treated at St. Bartholomew's Hospital. It is true that transfusion is not likely to be used except for severe cases, but the mortality appears to be higher where transfusion is often employed than elsewhere. Christiansen (1934) states that the mortality has doubled in the Kommune-hospitalet, Copenhagen, since transfusion has become common practice.

Cases should be selected for transfusion with more discrimination than is usual in hospitals where the facilities are greatest, and care should be taken to give not more blood than is required. As Cullinan and Price have pointed out, there is no evidence that transfusion helps to arrest hæmorrhage; in fact it occasionally has the opposite effect, being followed almost at once by a return of bleeding in cases in which hæmorrhage has ceased. Moreover the reaction following transfusion is sometimes severe, and this may be the direct cause of death without further hæmorrhage in patients who are already in a very weak condition.

Transfusion should in general not be given unless the hæmoglobin percentage is under 30 and the patient appears to be in danger of death from anæmia. About ten ounces is sufficient, and transfusion should

not be repeated unless the hæmorrhage recurs. Transfusion is not required for the restoration of the blood to the normal level, as the rise to normal is sufficiently rapid when thirty grains of iron and ammonium citrate are given three times a day.

A man of 25, whose hæmoglobin had dropped to 15 per cent. after repeated severe hæmorrhages from a duodenal ulcer, received a transfusion of 9 oz. of blood at once. Iron and ammonium citrate, 30 grains three times a day, was then administered. The hæmoglobin rose from 15 to 30 per cent. on the third day, 40 per cent. on the fourth, 60 per cent. on the seventh, 68 per cent. on the fifteenth, and 85 per cent. on his discharge on the fortieth day after admission.

Clotting is most likely to occur when the circulation is at a low ebb with the blood pressure low and the patient collapsed. A rapid rise in blood pressure may lead to recurrence of hæmorrhage, which would not take place if the rise in hæmoglobin is as gradual as it is with the administration of iron.

If it is decided that an operation must be performed in order to save the patient's life, transfusion should be given with the object of raising the hæmoglobin to a level which will make the operation safe. It is worth noting, however, that the only successful operation for hæmorrhage on a case of our own was performed before the war, and consequently no preliminary transfusion was given, although the patient, a man of 60, was in a condition of extreme anæmia and had been completely starved for eight days. Whether continuous drip transfusion, by means of which the hæmoglobin percentage can be raised rapidly from 20 or 30 per cent. to 80 or 90 per cent., has strong advantages over a single transfusion of twenty ounces given before operation and a second transfusion of twenty ounces given during or immediately after the operation is a matter deserving of further inquiry. We have never seen a case in which operation failed to save the patient because the hæmoglobin was insufficiently high; the technical difficulties caused by the size, position, and adhesions of the ulcer have always been the cause of failure. Continuous transfusion is likely to be actually dangerous if the surgeon is unable to secure the bleeding point, as the sudden rise of blood pressure would be likely to cause a recurrence of hæmorrhage after an indirect operation, such as gastrojejunostomy or partial gastrectomy with duodenal exclusion, performed for a bleeding duodenal ulcer.

There are other factors which contribute to death following hæmorrhage besides hæmoglobin deficiency. Among these loss of salt and fluid and a rising blood-urea should be especially worthy of study.

Iron

After a single small hæmorrhage regeneration of blood is rapid and no special treatment is required. On the other hand, after repeated small hæmorrhages or after a single massive hæmorrhage recovery can be greatly hastened by the administration of iron in adequate doses by mouth. Iron and ammonium citrate is always well tolerated, and the rapid rise of hæmoglobin following its use appears to hasten the healing of the ulcer. Unless an operation is contemplated it is thus unnecessary to give more than a single transfusion, as when thirty grains of iron and ammonium citrate are given three times a day there is generally an average gain of between 1 and 2 per cent. of hæmoglobin every day until the normal level is reached. Table IV. gives the hæmoglobin percentage in a series of cases, in which weekly estimates were made whilst iron was being given for the anæmia resulting from hæmorrhage after an ulcer. The patients were not transfused and were on the ordinary strict ulcer diet.

TABLE IV

Week of treatment.	M. 35 D.U.	F. 55 G.U.	F. 49 G.J.U.	M. 42 D.U.	M. 50 D.U.
– ..	56	46	62	58	52
1 ..	69	57	87	78	64
2 ..	80	66	96	98	70
3 ..	90	75	—	—	76
4 ..	—	90	—	—	—

Conclusions

1. The *incidence* of hæmorrhage is about 30 per cent. in gastric and duodenal ulcer and 45 per cent. in anastomotic ulcer.

2. *Mortality.*—The danger of hæmorrhage from ulcer has been grossly exaggerated in a number of papers recently appearing in British journals. The mortality among patients with hæmorrhage from an ulcer is about 1·5 per cent. in general practice. This figure is the nearest possible approach to the natural mortality. As the incidence of hæmorrhage in cases of ulcer is about 30 per cent., the mortality from hæmorrhage in all cases of ulcer, whether they have previously bled or not, is about 0·4 per cent. The mortality of cases of ulcer admitted into Guy's Hospital under A. F. H. on account of hæmorrhage is 4·8 per cent. The mortality from hæmorrhage in patients with a history of hæmorrhage from ulcer or admitted for ulcer is under 2·5 per cent., and the mortality from hæmorrhage of all cases of ulcer, including those which had never bled, is about 1 per cent. Comparing these figures with a private series (J. A. R.) we find a mortality of 3·1 per cent. from hæmorrhage in cases of severe hæmorrhage, and a mortality of 0·5 per cent. from hæmorrhage in all cases of ulcer.

3. *Surgery as prophylaxis.*—As the total mortality of all operations performed for gastric and duodenal ulcer is considerably greater than that of the mortality from hæmorrhage among all cases of ulcer, and as hæmorrhage is by no means rare after operations on patients with ulcer who have already bled, it is obvious, as Gordon-Taylor has also pointed out, that surgery cannot be regarded as a means of prophylaxis against fatal hæmorrhage. According to Balfour, hæmorrhage occurred after operation at the Mayo Clinic in 13 per cent. of cases of ulcer with a previous hæmorrhage, but in only 0·9 per cent. of cases with no history of previous hæmorrhage. Even partial gastrectomy does not prevent a reoccurrence of hæmorrhage. We have seen four cases in which hæmorrhage recurred within a year of the performance of a subtotal gastrectomy for ulcer.

4. *Surgery as treatment.*—It is generally not very difficult to recognise the rare cases of bleeding ulcer which will not recover from medical treatment. Unfortunately they are the same cases as those in which direct treatment of the bleeding point by operation is likely to be impossible, so that even when the operation is performed by surgeons of great experience and the patient has been adequately prepared by transfusion, the mortality after operation must be extremely high. Among the 4 fatal hospital cases under A. F. H. 2 might possibly have been saved by operation; on the other hand, an operation failed to save any of the 3 fatal New Lodge Clinic cases, and the 9 fatal cases among the 525 collected from general practice included the only 3 which underwent operation.

There can be little doubt that operation for a large proportion of cases after continuous transfusion, as recently advised by Gordon-Taylor, would lead to a considerable increase in the death-rate, as the mortality of interval operations for ulcer is at least as high as the actual mortality from hæmorrhage.

5. *Early feeding.*—There is no evidence to show that malnutrition was a factor in any of the fatal cases among the series analysed in this paper. It does not seem probable that immediate feeding after hæmorrhage, as advocated many years ago by Lenhartz and recently by Holmgren and Meulengracht, would have prevented any of the deaths in the series of cases which form the basis of this investigation.

6. *Transfusion and iron.*—The remarkably low mortality among cases seen in general practice indicates that the old-fashioned treatment with rest in bed, starvation, and morphia is all that is needed in the vast majority of cases, as very few received transfusion or underwent operation. In spite of this we believe that transfusion may occasionally save the life of patients who would otherwise die from anæmia, and that it is an almost essential preliminary in the rare cases in which operation is indicated. Apart from its use as a preliminary to operation a transfusion should not be given unless the percentage of hæmoglobin is under 30 per cent., not more than ten ounces of blood should be introduced at a time, and the transfusion should not be repeated unless hæmorrhage recurs. There have been favourable reports on the immediate benefits of continuous drip transfusion (Gordon-Taylor), but it is doubtful whether the method should ever be employed in cases of gastric hæmorrhage excepting as a preparation for immediate surgery.

Large doses of iron and ammonium citrate can be safely given from the third day following a hæmorrhage; they lead to a rapid return of hæmoglobin to a normal level and in this way greatly hasten convalescence.

7. If operation is reserved for the very rare cases in which it seems probable that the source of bleeding is a large hole in a sclerotic vessel exposed at the base of a chronic ulcer, and if transfusion is given only under the circumstances and by the method described above, it should be possible to obtain a still further reduction in the already low death-rate from hæmorrhage in gastric, duodenal, and anastomotic ulcer.

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FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—An afternoon course in dermatology, which is open to non-members, will be given at St. John's Hospital (Jan. 4th to 31st); an all-day course in cardiology, also open to non-members, at the National Heart Hospital (Jan. 11th to 22nd). Other courses will be given on advanced urology at St. Peter's Hospital (Jan. 18th to 30th); and on chest diseases at the Brompton Hospital (Jan. 25th to 30th). A course of surgical tutorial classes, specially intended for candidates for the F.R.C.S. (final) examination, will be given at the National Temperance Hospital on Tuesdays and Thursdays at 8.30 P.M. from Jan. 12th to March 4th. Further particulars may be had from the secretary of the fellowship, 1, Wimpole-street, London, W.1.

BLOOD CHANGES AFTER SURGICAL OPERATIONS

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THIS paper is based on a study of the water balance of 50 patients undergoing major abdominal operations. The methods used were as follows:—

1. Hæmoglobin estimations by the Haldane colorimetric method, on all cases.

2. Estimations of the relative cell and plasma volume by hæmatocrit, confirming the hæmoglobin estimations.

3. Plasma chloride estimations on many of the cases by the method of Claudius (1924).

4. Plasma protein estimations on the majority of the cases, using a modification of the method of Wong (Peters and Van Slyke 1932).

Blood was obtained from a deep ear-puncture and run into a small tube containing a minimal quantity of heparin. 0·4 c.cm. was collected without squeezing. Except in certain cases where venous blood was obtained simultaneously, only those samples of capillary blood which flowed freely and spontaneously were used for analysis. In a number of cases venous blood was also used. The patients were bled before operation and at frequent intervals (usually daily) afterwards.

The patients are grouped under the following heads according to the after-treatment they received:—

Group 1 (12 cases).—No special treatment.

Group 2 (27 cases).—Treated with rectal infusions or "forced fluids" by mouth.

Group 3 (9 cases).—Treated with intravenous saline.

Unclassified (2 cases).

The results of hæmoglobin, chloride, and protein estimations are presented separately for each group.

Results

Hæmoglobin.—It is obvious that hæmorrhage during operation reduces the amount of hæmoglobin and the number of red cells in the body; but the change does not become evident in blood samples until dilution has begun to restore the total volume to normal. Group 1 patients who received no excess of fluids after operation, or were even restricted in their fluid intake, showed a slow reduction of hæmoglobin percentage, which did not reach its new level, determined by the amount of hæmorrhage, for several days. This means that the normal process of dilution took a long time. Under these conditions recovery was slow and many of the patients complained of severe thirst and showed the dry tongue and sunken features found in dehydration. Figs. 1 and 2 are examples of results obtained in this group. Group 2 consists of patients who were more ill and who were therefore given rectal infusions or forced fluids by mouth. Their blood dilution (and therefore restoration of the blood volume) was more rapid, and so was their recovery. Figs. 3 and 4 are representative.

The accompanying Table summarises the statistical information, relevant to the present investigation, which can be derived from the data.

The values of t given at the end of the Table were obtained by comparing the two groups by the Fisher t-test technique. These values do not reveal significant differences between the groups either for initial or for

* This research has been made possible through the generosity of Sir Leonard Lyle, Bt., deputy president of the hospital.

FIG. 1

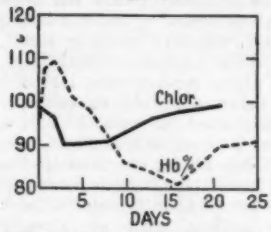
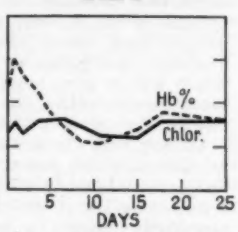


FIG. 2



FIGS. 1 & 2.—Chlorides (millimols) and hæmoglobin (per cent.) of "untreated" patients who received no excess of fluids after operation.

"Days" refers to time after operation when specimen was obtained. Results recorded at 0 days refer to specimens obtained before operation.

final hæmoglobin values, but the difference in the time taken to attain maximum dilution is highly significant. This result implies that, if the extent of the dilution of the hæmoglobin of the blood, as measured here, is a satisfactory indication of the restoration of plasma volume after operative hæmorrhage, then the restoration occurs in the treated cases more quickly than in the untreated cases, and the difference is highly significant.

The control group (the untreated cases, Group 1) is small in size, and, since both are heterogeneous with respect to the sort of operation performed, it may not be strictly comparable with the experimental group (the treated cases, Group 2).

Chlorides.—No important reduction in the plasma chlorides was found, but some cases treated with large quantities of saline per rectum developed hyperchloræmia with hydræmia. Fig. 3 is an example of this.

Proteins.—The results were compared on the following basis. If blood is diluted, the hæmoglobin and protein will show the same percentage fall provided that the protein is expressed (like the hæmoglobin) as a fraction of whole blood. Of the 37 patients thus investigated, 21 suffered no loss of protein after the operation beyond the loss due to hæmorrhage. The other 16 showed a loss which was rapidly restored in 11 of them.

—	Initial Hb.		Final Hb.		Time.	
	Untreated cases.	Treated cases.	Untreated cases.	Treated cases.	Untreated cases.	Treated cases.
Mean ..	95·6%	91·1%	83·8%	76·3%	9·1 day	4·4 day
Variance ..	138·7	162·9	127·3	105·0	12·3	3·7
Coeff. of variation	12·3%	14·0%	13·5%	13·4%	38·6%	43·7%
No. in group	10	27	..	..	..	..
t^* (n=35)..	+0·972		+1·925		+5·22	

* Sign obtained thus: Untreated cases −treated cases.
Two cases from Group 1 not included owing to complications.

Of 12 untreated cases (Group 1) 6 suffered a loss of protein and 6 did not. Of the 19 cases receiving additional fluid (Group 2) only 5 showed a temporary loss of protein, while 14 lost none; in fact they showed a steady increase. Of 6 cases receiving intravenous salines (Group 3) 5 lost protein, which was not recovered in three of them, and only 1 did not (case described later, see Fig. 5).

A temporary rise of hæmoglobin percentage above the pre-operative figure occurred in 14 of the 16 cases sustaining a loss of protein, but in only 3 of the 21 who gained protein.

Pulmonary œdema.—Four cases developed pulmonary œdema while the plasma protein was below the normal of 5·8 per cent. (Figs. 5 and 6). Two of these sustained a temporary loss of protein, one a permanent loss, and one, described later, a steady increase. In this case and in the two whose protein loss was only temporary, the abnormally low plasma protein percentage was due to rapid dilution of the blood. Only two other cases showed a temporary diminution of their plasma protein, and these had no symptoms of pulmonary œdema. In three of the four cases of pulmonary œdema the condition developed after the administration of intravenous saline.

FIG. 3

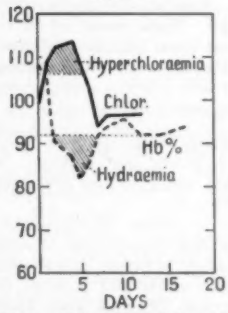


FIG. 4

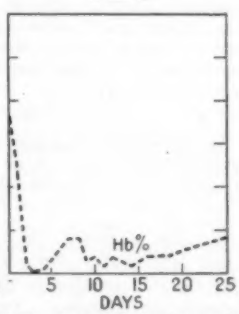


FIG. 3.—Chlorides and hæmoglobin of a patient who received 8½ pints of saline by rectal infusions within 3 days.

FIG. 4.—Hæmoglobin of a patient who received 5 pints of saline and 5 pints of glucose solution per rectum within 4 days.

Discussion

A number of workers [1-3 5 8] have shown that shock is accompanied by increased concentration of the blood-cells, particularly in the capillaries. Cannon, Frazer, and Hooper (1917) and Bazett (1918) found a temporary concentration of red cells in the blood after operations. Bazett (1918) and Robertson (1935) have shown that variations in the hæmoglobin percentage

FIG. 5

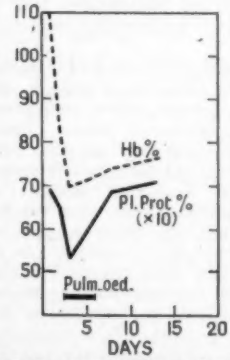


FIG. 6

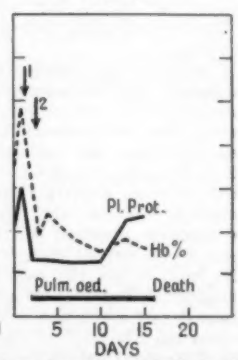


FIG. 5.—Hæmoglobin and plasma protein percentages in a case in which pulmonary œdema developed after intravenous administration of 6½ pints of alternate normal saline and 5 per cent. glucose within two days.

FIG. 6.—Hæmoglobin and plasma protein percentages in a case of postoperative pulmonary œdema. At 1 the patient received 6 oz. of blood and 16 oz. of gum saline intravenously. At 2 he received 2 pints of normal saline and 1 pint of 5 per cent. glucose intravenously.

are a measure of variation of the total circulating blood volume.

It is clear that the untreated patients of Group 1 suffered a fairly prolonged diminution of blood volume, while the treated Group 2 recovered the blood volume much more rapidly in spite of the fact that the patients of this group were more ill in the first instance. A considerable proportion of the patients in Group 1 and in the more seriously ill Group 3 lost protein in excess of what could have been lost by hæmorrhage as shown by the hæmoglobin percentage variation. This must have been due to loss of plasma which has been shown to occur in shock.[2 3 8] Another phenomenon of shock—namely, increased concentration of the red cells and hæmoglobin above the pre-operative level (see Fig. 1)—was present in nearly all the patients who lost protein. These cases can reasonably be said to have suffered from shock. Adequate treatment with fluids mostly prevented the changes typical of shock.

TREATMENT

As preventives of shock, there seems little to choose between fluids per os and fluids per rectum, but excess of salt is objectionable owing to the possibility of causing hydræmia (see Fig. 3).

The intravenous route is often disappointing. Samson Wright (1936) states that though oral or rectal saline may increase the blood volume, intravenous saline is not retained in the vessels and is soon lost through the kidneys. Further, Maizels and Smith (1934) have shown that since physiological saline is nearly twice as strong in chlorides as blood plasma, a strain is thrown on the kidneys to excrete the chlorides while retaining the water; and in this the kidneys may fail, with the result that the patient becomes more dehydrated than before. On the whole, in the present series, alternate physiological saline and 5 per cent. glucose in water by the continuous drip method was more successful intravenously than physiological saline alone.

The chief objection to intravenous fluid is the risk of pulmonary œdema. Dilution of the plasma proteins, and therefore reduction of the effective osmotic pressure, occurs first in the pulmonary circulation, and if the plasma protein percentage is low to begin with, the osmotic pressure may be reduced to such an extent as to allow leakage of fluid from the vessels into the lung. Of the 4 cases of pulmonary œdema, all had a low protein percentage, and in 3 the complication followed intravenous injection of saline.

A clue to the greater efficiency of rectal saline compared with intravenous saline is found in the increase of total circulating protein which took place during the administration of rectal saline. Fluid absorbed from the rectum must traverse the liver before reaching the general circulation and it seems reasonable to suppose that a certain amount of protein is "picked up" from the liver, thus raising the osmotic pressure of that particular sample of blood to an extent great enough to prevent loss of fluid from it via the capillary endothelium. Intravenous fluid has to traverse the systemic capillaries before it can reach the liver, and the dilution of the protein may be sufficiently great to allow transudation of the fluid before it can get a chance to reach the liver. Hence the greater danger of pulmonary œdema after intravenous saline than after rectal saline.

When the need to restore the blood volume is urgent, a more rational intravenous fluid is one containing the material, protein, which is necessary to maintain the osmotic pressure of the blood. Such a material is plasma. Since urgent cases usually show the increased concentration of the red cells typical of shock, and since there is an increasing danger from raised blood viscosity causing stasis, acidæmia, and poisoning of the capillary endothelium, which will in turn bring about further fluid loss and blood concentration, it must surely be exceedingly unwise to give a transfusion of whole blood. Starling (1909) states that if blood is transfused into an animal which has not lost blood, the fluid and a proportion of the protein leave the circulation causing a concentration of red cells. Although this will not necessarily occur in a patient with an already depleted blood volume, there cannot fail to be an increase in the number of circulating red cells, and it seems a pity to superimpose a polycythæmia on shock. One can only conclude that the ideal treatment of an urgent case is plasma transfusion.

CASE REPORTS

Three cases are worthy of special description.

BURNS: LOSS OF PROTEIN

A woman of 27 was admitted with second and third degree burns over back, buttocks, and both legs, rather more than half her body surface being involved. After treatment with tannic acid she was found to have a blood pressure (systolic) of 108, the pulse-rate being 124. Capillary and venous hæmoglobins were 114 and 116 per cent. respectively, and the plasma protein was 6·75 per cent. in both. Twenty-four hours later she was almost pulseless, the blood pressure was 100, and the capillary and venous bloods gave hæmoglobins of 160 and 130 per cent. respectively. Three pints of a gum-saline solution were given slowly into a vein with considerable improvement in the pulse, though the rate remained at 140. An ear-puncture flowed freely giving a hæmoglobin of 100 per cent. and a plasma protein percentage of only 3·44. Twelve hours later the pulse was weaker, but the capillary hæmoglobin remained at 100 per cent. She died four hours later.

The findings here are in agreement with the work of Blalock (1931) who showed that whole plasma was lost from the circulation in experimental burns, and of Underhill and his associates (1923) who demonstrated blood concentration in a series of accidental burns. Incidentally, the hæmoglobin concentrations obtained by these workers are remarkable. When it is considered that with a hæmoglobin concentration of 110 per cent. the cells occupy about half of the total blood volume, their figures of 200 per cent. or over must indicate that the blood consisted only of cells. No doubt the blood was obtained from capillaries as a result of considerable squeezing.

Inasmuch as these cases of severe burns show great blood concentration from plasma loss, the rational treatment is to use plasma transfusion to replace what is lost. Blood transfusion, which supplies more cells to an already concentrated blood, cannot be recommended.

INTRAVENOUS INFUSION; PULMONARY ŒDEMA; ? HISTAMINE SHOCK

A boy, aged 8 years, was operated on early one morning as an emergency, some 5 ft. of small intestine which had been strangulated by a fibrous band and had become "gangrenous" being freed and returned to the abdomen under local anæsthesia. He was seen a few hours later when his pulse was of small volume and 140 per minute. In contrast to the usual appearance of shock with its greyish pallor, he was bright red in the face, with the flushed appearance one might expect from the presence in the circulation of histamine or some vasodilator substance (Knight and Slome, 1936).

The effect of treatment on the blood concentration is shown in Fig. 5. Except on the first day when venous blood

only was used for analysis, capillary and venous blood gave the same results. Signs of pulmonary œdema were noted two days after the operation, and on this day, as a result of dilution with intravenous saline, the plasma protein was only 5·3 per cent. Thereafter recovery was rapid.

This case is of interest because of the very considerable blood concentration which was present without any sign of stasis; also because of the good effect of intravenous saline and glucose, and the development of pulmonary œdema when the plasma protein had reached a subnormal value.

SHOCK WITH RAISED BLOOD ADRENALINE

A laparotomy was done on a man of 73, and, an inoperable carcinoma of the stomach being found, the abdomen was closed. Next day his pulse-rate was 100 with fair volume, his tongue was dry, his colour normal, but the veins of his arms were slightly contracted and would not dilate when a tourniquet was lightly applied above them. His capillary and venous hæmoglobin had risen from 79 per cent. before operation to 85 per cent., while the plasma protein had fallen from 6·13 to 6 per cent. Two days after the operation his appearance was remarkably changed. His tongue was dry, he was very thirsty in spite of copious drinks, his lips were cyanosed, and he was slightly breathless. The pulse-rate was 132 and of poor volume, and the blood pressure was 125/85. His face was cold and had a greyish pallor, and the capillaries would not empty readily under pressure nor refill when the pressure was released, the blood flowing in them like tar. The veins were noted to be much contracted.

Since Freeman (1933) has produced all the phenomena of shock in cats by injection of adrenaline in physiological amounts into their circulation, it was decided to perform a blood adrenaline estimation on this patient while he was in his "vasoconstricted" condition. Using Whitehorn's method (1935), 0·24 ± 0·02 mg. of adrenaline was found per litre of blood—a quantity stated to be much in excess of normal. The capillary and venous hæmoglobins were 106 and 96 per cent., and the plasma protein 7·38 per cent. An attempt to give intravenous saline failed because the fluid would not pass along the contracted vein. Four days after operation he was slightly better, his colour was improved, the pulse-rate was 112 with better volume, and the capillaries were not so contracted. Capillary and venous hæmoglobins were 96 and 84 per cent., and the protein 6·56 per cent.

On the following day, five days after operation, his appearance was completely changed. His face was bright red, his pulse was 100 and of good volume, the blood pressure was still 125/85, and the capillaries were easily emptied and refilled. The capillary and venous hæmoglobins were each 81, the plasma protein 5·81 per cent., and the blood adrenaline nil. At 5 A.M. the following morning the patient died suddenly of a pulmonary embolus.

In this case there was extreme concentration of the blood associated with almost continuous loss of protein from the circulation and greater concentration of the cells in the capillaries than in the veins. These changes, together with the patient's appearance, were typical of traumatic shock. The raised blood adrenaline, taken in conjunction with the work of Freeman (1933), is significant.

Of the factors that may contribute to intravascular thrombosis (Frey 1933) two were definitely present in this case—namely, vascular stasis and an increased sedimentation-rate, already high before operation (20 mm. from a column of blood of 100 mm. in one hour) and likely to be even higher afterwards (Chauvin, Esmenard, and Jaur 1926). And the one condition likely to loosen the clot in an inactive patient was also present later—namely, vasodilatation. The clot after formation is loosely attached to the vessel wall, and this attachment can be severed by the shearing effect of dilatation of the vessel.

Conclusions

1. Patients who have undergone major abdominal operations tend to suffer from anhydræmia, the duration of which depends on the efficiency of the after-treatment. Improvement in the clinical condition of the patient tends to run parallel with the restoration of the blood volume.

2. If left untreated, anhydræmia may develop into true shock, characterised by concentration of the blood from plasma loss. Even if shock does not appear, dehydration may take place and seriously interfere with the patient's comfort and rate of recovery.

3. The best method of fluid replacement if the oral route is contra-indicated is per rectum, preferably by continuous drip. The rectal administration of fluids at the rate of over two pints per day shortens the time for blood dilution and for the accompanying improvement in the clinical condition.

4. Since no evidence of serious chloride deficiency was found after operation, the fluid given per rectum need not contain the chloride excess found in "normal" saline. On the contrary, excessive administration of "normal" saline may even lead to hydræmia.

5. Adequate treatment with rectal fluid tends also to prevent the onset of shock as shown by plasma loss and increasing concentration of the red cells in the blood.

6. Since pulmonary œdema may result from abnormally low percentage of protein in the plasma, and since intravenous fluids tend to lower this percentage, the level of the plasma protein should be ascertained before giving fluid intravenously.

7. Owing to the danger from protein loss, emergency treatment of post-operative shock should preferably consist in intravenous infusion of plasma. Inasmuch as extensive burns lead to much loss of protein, the ideal treatment of this condition must be intravenous plasma infusion.

8. Blood transfusion for shock and burns is contra-indicated in the absence of anæmia or massive hæmorrhage. It carries a risk of increasing the already high concentration of the red cells in the blood and so encouraging stasis.

I should like to record my thanks to the staff of Queen Mary's Hospital for giving access to their patients, to Dr. M. Maizels and Dr. G. R. Cameron, of University College Hospital, for much information and help, to Prof. Samson Wright for his valuable criticism, and to Mr. W. F. Floyd, of Middlesex Hospital medical school, for making the statistical summary of the hæmoglobin results.

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FIBRINOLYSIS FOLLOWING OPERATION

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A small quantity of blood taken immediately after an operation for cholecystectomy led by chance to the observation of a curious phenomenon. It had been allowed to clot in a centrifuge tube and was left overnight at 37° C. in order that the serum might be obtained when retraction was complete. The next morning, however, it was found that the blood was quite fluid and all trace of the clot, which had been perfectly firm the evening before, had disappeared. A few days later my attention was called, by Dr. L. P. Garrod, to a recent paper by S. S. Yudin, in which the Russian practice of transfusing with blood obtained from corpses was described. In this paper stress was laid upon the fact that persons meeting sudden or violent death were particularly useful donors for a very remarkable reason. If, in these cases, the blood was withdrawn soon after death, it was found that, though coagulation soon took place in the ordinary way, the blood returned to the fluid state in the course of an hour or two, the clots having apparently dissolved. Since it showed no further tendency to coagulate, the addition of anticoagulants was not required, and it could be preserved in this state almost indefinitely, being used for transfusion when needed.

In the light of this paper, therefore, the phenomenon first described began to assume a possible significance, particularly since the fibrinolysis observed by the Russians was associated in their minds with the profound shock experienced before death. The question arose as to whether this fibrinolysis occurred, possibly in a lesser degree, in living persons who had suffered accidental trauma, or undergone surgical operation. Though this problem is at present more of academic interest than of clinical importance it was decided to investigate it. The present paper is a report of the admittedly incomplete and elementary experiments with which this investigation has been begun.

EXPERIMENTS

Patients undergoing surgical operation were selected as being the best subjects to begin with, since blood could be obtained immediately before, and immediately after, the trauma, and accurate control therefore obtained. The anæsthetic, of course, introduced a variable factor, but by choosing a series of cases which included the use of inhalation, spinal, and local anæsthesia, it was felt that the effects of these could be determined and eliminated.

At first, attempts were made to repeat the original observation. Blood was obtained by venipuncture before and after operation in about 20 cases, and allowed to clot in centrifuge tubes. These tubes were then incubated at 37° C. and the contents examined in twenty-four hours. In 2 cases complete lysis had occurred at the end of this time in the post-operative blood. In one of these the blood was from a woman who had an operation for cholecystectomy; in the other it was from a woman who had a needle removed from her hand under a local anæsthetic.

In a large proportion of the remaining cases the post-operative clots appeared to be more friable than those obtained from the pre-operative blood, though there was no definite evidence of lysis. The method appeared to be unsatisfactory, since the turbidity of the fluid made it impossible to see the state of the clot without interfering with it. It was therefore decided to experiment with recalcified citrated plasma.

Blood was obtained before and after operation as in the previous series, but was immediately citrated by the addition of one-tenth of its volume of 3·8 per cent. sodium citrate solution. It was then centrifuged at slow speed for ten minutes by the clock, and the plasma removed by pipette. Of this, 4 c.cm. was recalcified in each case by the addition of 1 c.cm. of 1·18 per cent. calcium chloride solution, and the tubes containing the clots incubated for twenty-four hours at 37° C. as before. In 2 cases out of 22 examined in this way complete lysis occurred during the period of incubation, one being after nephrectomy, and the other after excision of an epithelioma on the back. Both patients were males and both had general nitrous oxide oxygen and ether anæsthesia.

The remaining 20 cases again showed indefinite signs of lysis; in the majority the post-operative clots were more fragile (in some cases actually fragmented), and the serum more turbid than was the case with the pre-operative controls. The results, however, were inconclusive, and a method of measuring the exact degree of lysis after a definite period of incubation was required. Attempts were made to weigh the clots, after washing and drying, and thus determine the extent of lysis, if any. This project proved to be unsuccessful. It was found impossible to free the close-textured plasma clots from adsorbed serum proteins to a satisfactory degree, and inconsistent results were obtained. It was an attempt to overcome this difficulty that led to the production of what appears to be a delicate and satisfactory method of demonstrating fibrinolysis.

In order to reduce the adsorption of serum proteins on to the fibrin that was to be weighed, a method commonly used in the estimation of blood fibrinogen was employed. If 1 c.cm. of citrated plasma be added to 1 c.cm. of 1·18 per cent. calcium chloride solution and 28 c.cm. of 0·85 per cent. saline, subsequent coagulation results in the formation of a fine fibrin reticulum throughout the whole volume of the fluid. This web can be wound on to a glass rod, washed in distilled water, and its mass estimated directly by drying and weighing, or from its nitrogen content by the micro-Kjeldahl apparatus.

It was proposed to prepare two such webs from pre-operative, and two from post-operative, blood, one of each of these to be estimated immediately, and the other two after 24 hours' incubation.

Accordingly blood was obtained from a man about to undergo an operation for the cure of an inguinal hernia, under a local anæsthetic. It was at once citrated, and the plasma obtained as before. The fibrin webs were prepared in the way described in two boiling tubes, one of which was incubated. The other was used immediately to estimate the blood fibrinogen, by the gravimetric method. The whole process was then repeated with blood obtained as the patient was leaving the theatre, the technique being rigidly adhered to.

The pre-operative and post-operative blood fibrinogens were found to be 320 and 310 mg. per 100 c.cm. respectively. The pre-operative and post-operative fibrin webs remaining were left until the next morning

* Assisted by an expenses grant from the Medical Research Council.

at 37° C., when it was proposed to estimate their mass in the same way. The next morning, however, it was found that this procedure could not be carried out. The pre-operative web was intact, giving an equivalent of 310 mg. per 100 c.cm., but the post-operative web had completely disappeared, leaving a clear fluid. Similar results were obtained with two cases of partial thyroidectomy, the pre-operative clots remaining intact and the post-operative fibrin dissolving in less than 24 hours.

The Effect of Operation on Fibrinolysis

Operation.	Sex	Anæsthetic.	Fibrinolysis.	
			Pre-operative.	Post-operative.
Laparotomy.	F.	G.O. & E.	None in 3 d.	Complete in 8 hr.
Inguinal hernia.	M.	Local.	„ „	„ 24 „
Total thyroidectomy.	F.	„	„ „	None in 3 d.
Removal of sacral dermoid cyst.	M.	G.O. & E.	None in 24 hr.	Complete in 20 hr.
Lumbar ganglionectomy.	F.	Evipan +G.O.E.	„ „	„ 24 „
„ „	F.	G.O.E.	None in 3 d.	None in 3 d.
Drainage of Brodies' abscess.	M.	Evipan +G.O.E.	„ „	Complete in 24 hr.
Amputation of toe.	M.	G.O.E.	„ „	„ 36 „
Pyelolithotomy.	F.	„	„ „	„ 24 „
Excision on piles.	M.	Spinal.	„ „	„ 20 „
Inguinal hernia.	M.	Local.	„ „	Partial in 3 d.
Ureterolithotomy.	F.	G.O.E.	Partial in 24 hr.	Complete in 4 hr.
Inguinal hernia.	M.	Local.	None in 24 hr.	„ 24 „
„ „	M.	„	None in 3 d.	„ 24 „
Partial thyroidectomy.	F.	Local + avertin.	None in 24 hr.	„ 24 „
„ „	F.	„	„ „	„ 8 „
„ „	M.	Local + G. & O.	None in 3 d.	None in 3 d.
Inguinal hernia.	M.	Evipan, G. & O.	None in 24 hr.	Complete in 18 hr.
„ „	M.	„	„ „	„ 14 „
Resection of gut.	M.	G.O.E.	None in 3 d.	„ 3 „
Cholecystectomy.	F.	„	„ „	„ 6 „
Inguinal hernia.	M.	„	„ „	„ 24 „
Appendicectomy.	F.	„	None in 24 hr.	„ 24 „
Nephrectomy.	F.	„	None in 3 d.	None in 3 d.
Removal of sacral dermoid cyst.	M.	„	None in 2 d.	None in 2 d.
Cholecystectomy.	F.	„	None in 3 d.	Complete in 4 hr.

G. = gas. O. = oxygen. E. = ether. d. = days.

At this stage blood was obtained from 6 normal donors, and fibrin prepared in the same way. In these, incubation was carried on for longer periods to observe the changes that were likely to occur in normal fibrin under these conditions. In one of these there was evidence of some lysis after 48 hours, since the web broke up into fragments on gently shaking the tube, the other 5 being unaffected by similar treatment. These fragments, however, did not dissolve until two days later. By the fifth day one other tube showed the same change, but the other 4 were unaffected, and when two days later the experiment was discontinued, these were still intact. In 4 out of 6 therefore lysis did not occur in seven days, in one partial lysis took place in two days and complete lysis in four days, and in the remaining one, partial lysis had begun by the fifth day but was not complete on the seventh. Blood was then obtained from a series of operation cases, which are tabulated above. In every case blood was obtained within one hour of the operation, and usually as the patient was leaving the theatre. The pre-operative blood was obtained the day before, or before premedication was given in all except 3 cases, when it was taken just before the anæsthetic was administered.

From the accompanying Table and the 3 cases described previously it will be seen that in 22 cases out of a total of 29 complete lysis of post-operative clots occurred in twenty-four hours. Of the remaining 7, 2 showed increased lysis as compared with the controls, and 5 showed none during the period of incubation employed.

Experiments were then performed to ascertain, if possible, the nature of the lysis. It appeared to be a physical rather than a chemical change, though this has not yet been confirmed. The first stage is one of fragmentation of the clot, which proceeds until dispersion is complete. The fluid remaining is quite clear by ordinary transmitted light but the Tyndall beam is brighter after lysis than before. After standing for several days at room temperature, the fluid containing lysed fibrin deposits a light precipitate, which redisperses on warming or shaking.

In 4 cases showing post-operative lysis the following experiment was performed. As soon as the fibrin webs had formed they were removed from the fluid, washed in two changes of saline, and placed in each other's fluid. The results obtained were the same in each experiment and are summarised below :—

Tube.	Contents.	Lysis in 24 hours.
1A	Pre-operative fibrin. Pre-operative fluid.	None.
1B	Pre-operative fluid. Post-operative fibrin.	Complete.
2A	Post-operative fibrin. Post-operative fluid.	„
2B	Post-operative fluid. Pre-operative fibrin.	None.

These results suggest that the lysis therefore is due to some change in the fibrin, or some substance adsorbed by it from the serum, rather than the presence of a free lysin. To differentiate between these alternatives, the following experiment was performed. Pre-operative and post-operative fibrin, washed in saline as before, was added to post-operative and pre-operative plasma, in a concentration of 1 in 30 in saline, with the addition of a few drops of sodium citrate solution, to prevent possible coagulation by any calcium remaining in the fibrin. The results were as follows :

Tube.	Contents.	Lysis in 24 hours.
1A	Pre-operative fibrin. Pre-operative plasma.	None.
1B	Pre-operative plasma. Post-operative fibrin.	Complete.
2A	Post-operative fibrin. Post-operative plasma.	„
2B	Post-operative plasma. Pre-operative fibrin.	None.

These results suggest that the lysis is due to a change integral with the structure of the fibrin itself.

In all these experiments, of course, sterile apparatus and solutions were used and aseptic technique adopted. Cultures taken from the contents of tubes after incubation have remained sterile in the cases reported.

CONCLUSION

The position therefore is as follows. Some change in the fibrin structure occurs as a result of trauma, which, under strictly aseptic conditions, results in the dispersion of the fibrin reticulum. This change has been observed under the conditions described in 24 out of 29 operation cases, obviously too small a series to be conclusive, but large enough to be suggestive. Bacteria do not appear to play a part, since cultures of the fluid containing lysed fibrin are sterile. Whether this rapid lysis is merely an acceleration of the normal aseptic lysis, which is regarded by Nolf as the natural sequel to coagulation, remains to be seen. Future work will be directed towards the confirmation of its occurrence as described, and to a possible elucidation of its mechanism and significance.

My thanks are due to Prof. Geoffrey Hadfield and Prof. Paterson Ross for their interest and advice, and to those members of the surgical staff of St. Bartholomew's Hospital who have given permission for these investigations to be carried out on their cases.

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CHEST DEFORMITIES IN ASTHMA

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WHEN asthma is of long standing emphysema is nearly always present. The distension is the sequel of a functional rather than an organic disorder of the lung, and with abatement of the attacks of asthma the lungs gradually empty themselves and return to their original size. With recurrent and protracted attacks, however, the approximation to normal is less complete after each attack, and the chest wall becomes distended and fixed. In well-established cases the shoulders are lifted and the back is hunched. The sternum bulges prominently and may form a typical pigeon breast. The chest is rounded in its upper half, there is a deep lateral sulcus, and the base is narrow and contracted. The appearance of the chest is that of an inverted flask. This deformity is quite different from the "barrel chest" usually associated with genuine hypertrophic emphysema. In the barrel chest the upper part of the thorax is not unduly expanded, the widening of the chest increases progressively from above downwards, and reaches its maximum at the base. Dorsal kyphosis and anterior pigeon deformity are not prominent features.

Chest deformities of long-standing asthma are easily detected even with the patient fully clothed. Not every asthmatic, however, presents the same degree of chest deformity, and the deformity varies with each type of individual in its time of onset as well as in its rapidity and extent of development. The stature of the asthmatic sufferer is an important factor, the thin type showing chest abnormalities more readily than the obese type. Moreover, in obese subjects and in women with large breasts deformities of the chest wall are difficult to detect by inspection alone, since soft parts may completely mask the deformity. In such cases radiological examination of the contour of the chest wall is very helpful. The method I use is to outline the contour of the chest wall on an X ray film and to transpose it on a sheet of paper. If the radiogram has been taken correctly, the outline of the chest will be clearly visible on the film, the edge of the ribs contrasting quite sharply against the shadow of less density given by soft parts covering the thorax.

TABLE I

Ages of 82 Asthmatic Patients showing Chest Deformity

Age.	Number of cases.	Percentage.
1–10 years ..	12 } 27	33
10–20 " ..	15 }	
20–40 " ..	37 } 55	67
40–60 " ..	18 }	

A radiological study of chest deformities has been made in a series of 128 consecutive and unselected cases of asthma attending the asthma clinic at the Leeds General Infirmary. This paper does not deal with the more usual radiological signs of emphysema, such as localised brilliancy of the lung fields, increased density of the hilum shadows, and limitation of movements of the diaphragm. From a recent discussion[1] it appears that radiologists now agree that the radiological diagnosis of emphysema must never be based on one sign alone but always on a combination. One of the speakers, Dr. Kerley, gave a timely warning that the so-called increased translucency of the lungs may be due to factors which have nothing to do with the lungs. Thus it can be produced by over-exposure or over-penetration, and it is also seen under normal technical conditions in thin subjects. This is a point of some importance, for undue reliance on this very misleading radiological sign probably leads to the diagnosis of emphysema being made more often than is justified.

TABLE II

Duration of Illness in 61 Cases showing Chest Deformity

Duration of illness.	Number of cases.	Percentage.
0– 1 year ..	3 }	
1– 2 years ..	7 } 23	38
2– 5 " ..	13 }	
5–10 " ..	21 } 38	62
10–over	17 }	

It is somewhat surprising that in the radiological diagnosis of emphysema more attention is not paid to the appearances of the bony framework, for distension of the lungs must inevitably bring about deformity of the chest wall, and the degree of the deformity is therefore a good exponent of the amount of over-stretching which has taken place in the lungs.

In early cases the most noticeable change is a "ladder" appearance of the contour of the chest. Normally the ribs, which run obliquely from above downwards and forwards, overlap each other in a regular fashion, and with their outer surface form an even outline of the thoracic wall (Fig. 1). As the lungs become over-expanded the ribs become raised and approach the horizontal position, normal overlapping does not occur, the outer surfaces of the ribs fail to form an even contour, and the outline of the chest becomes irregular (Figs. 2 and 6). This type of chest is often observed in asthmatic children and in

adults with a short history of asthma. In cases of longer standing a definite rounding of the chest takes place. It is most noticeable in the upper part of the chest and affects mainly the six upper ribs; one hemithorax may be more affected than the other, so that the chest becomes asymmetrical. Often the over-expansion is limited to a small area of the thorax and it may be localised to the upper or middle zones. The intercostal spaces become wider in the over-expanded part of the chest, but the widening occurs in a very irregular fashion and not evenly from above downwards as it does in true hypertrophic emphysema. Thus over-expansion of the lungs in asthma may select one part of the lung more than another. In cases with gross deformity the thorax assumes the appearance shown in Figs. 3 and 5. The upper part is rounded, the ribs are raised and horizontal, and the upper chest has a ballooned appearance. At the level of the costal attachments of the diaphragm, and especially at the level of the 9th and 10th ribs, the chest is drawn in and forms a deep lateral sulcus. The lower part is unduly narrow and contracted. This type of deformity is quite different from the so-called barrel chest of genuine hypertrophic emphysema, in which the thorax becomes progressively wider from above downwards, with a large inferior aperture and an obtuse subcostal angle (Figs. 4 and 7). In a barrel chest the outline as seen on a radiogram has the shape of a cone. A barrel chest is quite uncommon in bronchial asthma, and was not found in more than 10 per cent. of cases in the present series of 128 cases. When it does occur it usually indicates the presence of true emphysema from chronic bronchitis or a pneumoconiosis.

Thoracic deformities are commoner in adults than in children, and their incidence increases after the second decade. Thus of 82 patients showing such deformities, 55 (67 per cent.) were over twenty years of age (Table I.). Thoracic deformities occur fairly frequently in asthma, and of the present series of 128 cases they were observed in 82 (65 per cent.). In 14 there was very marked over-expansion of the chest, 48 showed definite changes, while 20 showed early and slight deformities. The degree of deformity was found to depend mainly on the duration of the illness and the frequency and severity of the attacks of asthma. Cases of less than five years' standing showed the lowest incidence (Table II.). Occasionally, however, well-marked chest deformities have been observed in patients with only a short history of asthma, and this suggests the possibility of a hereditary predisposition to their development. Hajós [2] found 16 per cent. of the so-called hereditary type of emphysematous thorax among 164 cases of asthma. But it must be noted that these patients often have a long history of bronchitis during the anteparoxysmal stage. Moreover the low percentage of such cases discredits the suggestion that asthma is the result and not the cause of the distended chest.

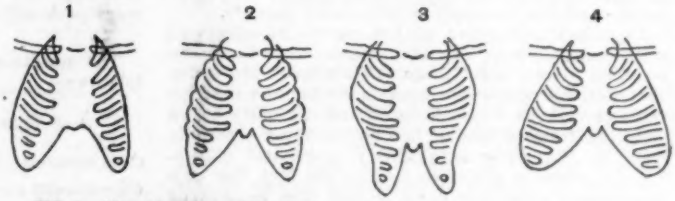

FIG. 1.—Normal contour of the chest.
FIG. 2.—"Ladder" appearance of early type of chest deformity in asthma.
FIG. 3.—Typical chest deformity in long-standing asthma.
FIG. 4.—"Barrel chest" of hypertrophic emphysema.

SUMMARY

1. The chest deformity resulting from functional emphysema in asthma differs from the barrel chest of true hypertrophic emphysema.

2. Early thoracic changes may escape clinical observation but are recognisable radiologically by outlining the contour of the chest on an X ray film.

3. In a radiological study of 128 cases of asthma chest deformities were found present in 65 per cent. of cases.

4. The degree of deformity depends upon the duration of the illness and the frequency and severity of the attacks.

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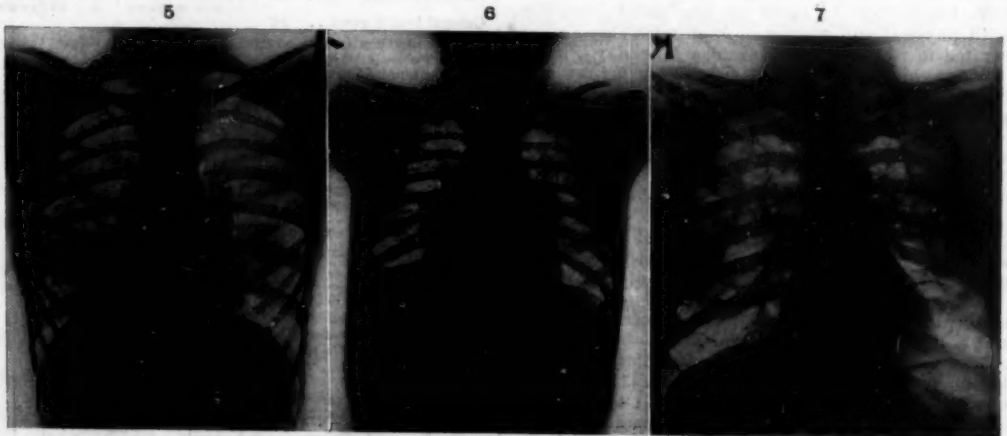

FIG. 5.—Long-standing case of asthma showing well-marked chest deformity. Girl aged 15. Asthma for 12 years.
FIG. 6.—Case of asthma showing "ladder" effect.
FIG. 7.—Barrel chest of genuine hypertrophic emphysema.

REMOTE EFFECTS OF PUERPERAL SEPSIS

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It is a widespread belief of the lay and medical public that puerperal sepsis is a uniquely crippling disease, with a train of physical, psychological, and eugenic ills. Patients and their doctors appear to expect a long period of invalidism to follow the acute stage of a puerperal infection, and "considerate" behaviour is exacted from husband and relatives to far beyond the necessary or chivalrous measure.

In this investigation of the remote ill effects of puerperal infection in 100 women treated in the isolation block of Queen Charlotte's Maternity Hospital, allowance has been made for the descriptions of malaise, neurosis, or actual disability to be expected from women of a corresponding economic walk in life, even at ordinary post-natal clinics. Enough stress is not often laid on the fact that any practitioner observing cases in the first months of the post-natal period cannot fail to receive complaints of bodily and mental impairment related to the confinement. A woman bearing her child in the first year of married life endures the adjustments of marriage, pregnancy, and delivery in rapid succession. She manages her household work until term; she is then tenderly treated in the maternity hospital during the lying-in period, relieved of work and anxiety, and accustomed to a new high standard of life for a few weeks; and finally she is discharged to the burden of housekeeping plus the new, heavy, unremitting care of her baby. Previously existing economic difficulties are increased by the new addition to the family, nursing is an added strain on the not completely readjusted organism. Anxiety bred of unpractised mothercraft, loneliness after the congenial community of the lying-in ward, decreased opportunities to enjoy the common leisure of herself and her young husband because of the incessant needs of the child—all these are factors that must contribute to the want of well-being suffered in the 12–18 months after childbearing by any woman of below a certain economic level of society, and all but a very few of my cases were drawn from such a class. Adequate discount, therefore, has had to be made for the natural reaction, both physical and psychical, from normality; exaggerated in my cases by the longer "holiday" in the isolation block, and the "rich living" that is a most necessary part of the successful treatment of puerperal sepsis.

The causes of these disabilities cannot fairly be traced to the puerperal infection, nor is their remedy in the hands of the medical man.

PROCEDURE

The scope of the inquiry was limited to a careful survey of the general health since the puerperal infection—noting the possible relation of any serious illness or operation to the original disease—the menstrual history, the subsequent obstetrical history, and a general and pelvic examination.

The material was derived from the files of the last few months of 1930, the whole of 1931, and the first month of 1932, arranged in Groups 1 to 5, according to the clinical history of the puerperal infection. Four years had passed since the time of illness in most cases, and in some nearly five years. All the cases selected had suffered puerperal infection of more than average severity; their period of treatment in the isolation block had ranged from 4–5 weeks for septic endometritis without complications, to 12–14 weeks and over for peritonitis, cellulitis, or septicæmia,. The great majority, as is usual in cases of such severity, had been infected with the hæmolytic streptococcus, which, with other pathogenic organisms, had been demonstrated bacteriologically in the genital tract, and/or the blood, peritoneal exudate, &c., according to the localisation of the lesion.

For the purpose of this investigation 208 invitations to attend for examination were sent out, and 100 responses were received. I examined all the cases personally.

RESULTS

The results may be set out in tabular form as follows:—

GROUP 1

Acute Septic Endometritis without Complications

Cases examined	22	Primiparæ	18	Average age 27¼ years.
		2-paræ	2	
		3-paræ or more	2	
General health good	22			
Serious illnesses (possibly related to puerperal infection)—				
Rheumatoid arthritis			1	
Menstrual history—				
Normal			18	
Dysmenorrhœa			2	
Irregular			1	
Menorrhagia			1*	
Vaginal discharge—				
Slight, occasional			11	
None			9	
Continuous since infection			2	
Subsequent pregnancies—				
None			20	
Full term			1	
Miscarriage			1†	
General examination—				
Bones and joints: rheumatoid arthritis			1	
Pelvic examination—				
Nil abnormal			19	
Cervicitis			2	
Procidentia			1	

* Hysterectomy for fibroids, 1935.

† 8 weeks. Uterus emptied for therapeutic reasons unconnected with puerperal fever.

GROUP 2

Pelvic Cellulitis with or without Thrombophlebitis, Phlegmasia Alba Dolens, &c.

Cases examined	36	Primiparæ	26	Average age 26½ years.
		2-paræ	8	
		3-paræ or more	2	
General health good	34			
Serious illnesses (possibly related to puerperal infection)—				
Rheumatoid arthritis			1	
Pulmonary tuberculosis			1*	
Menstrual history—				
Normal			26	
Dysmenorrhœa			9	
Irregular			8	
Menorrhagia			0	
Vaginal discharge—				
Slight, occasional			11	
None			20	
Continuous since infection			5†	
Subsequent pregnancies—				
None			33	
Full term			3	
Miscarriage			0	
General examination—				
Respiratory system abnormalities			1	
Bones and joints (arthritis)			1	
Pelvic examination—				
Nil abnormal			33	
Uterine displacements			1	
Residual thickening of ligaments			1†	
Cervicitis			2†	

* Treated and cured at Papworth.

† One, gonorrhœal, being treated at Royal Free Hospital.

GROUP 3

Peritonitis: Diffuse, 3; *Pelvic (including Tubal Masses)*, 11

Cases examined ..	14	Primiparæ ..	8	Average age 28¼ years.
		2-paræ ..	3	
		3-paræ or more	3	
General health good ..	12			

Serious illnesses (possibly related to puerperal infection)—

Pernicious anæmia	1

Menstrual history—

Normal	11
Dysmenorrhœa	0
Irregular	2
Menorrhagia	1*

Vaginal discharge—

Slight, occasional	8
None	5
Continuous since infection	1

Subsequent pregnancies—

None	14

General examination—

Circulatory system abnormalities (mitral incompetence)	1
Nervous system abnormalities (disseminated sclerosis)	1

Pelvic examination—

Nil abnormal	10
Tubal mass	2
Cervicitis	1
Ovarian cyst	1*

* Same patient.

GROUP 4

Septicæmia Complicating Endometritis, Cellulitis, &c.

Cases examined ..	19	Primiparæ ..	15	Average age 27 years.
		2-paræ ..	3	
		3-paræ or more	1	
General health good ..	17			

Serious illnesses (possibly related to puerperal infection)—

Pulmonary tuberculosis	1*
† Glandular fever	1
Rheumatic fever	1
Quinsy	1

Menstrual history—

Normal	19
Dysmenorrhœa	0
Irregular	0
Menorrhagia	0

Vaginal discharge—

Slight, occasional	11
None	8

Subsequent pregnancies—

None	19

General examination—

Respiratory system abnormalities (pulmonary tuberculosis)	1*
Circulatory system abnormalities (mitral incompetence)	1

Pelvic examination—

Nil abnormal	19

* Treated and cured at Brompton Chest Hospital.

GROUP 5

Acute Septic Endometritis with Complications, Urinary Tract Infection, Pulmonary Infection, or Infective Arthritis

Cases examined ..	9	Primiparæ ..	5	Average age 26¾ years.
		2-paræ ..	4	
		3-paræ or more	0	
General health good ..	8			
„ „ impaired	1	(septic arthritis with marked deformity of hands, improving slowly with treatment)		

Serious illnesses (possibly related to puerperal infection) 0

Menstrual history—

Normal	7
Dysmenorrhœa	2

Vaginal discharge—

Slight, occasional	5
None	1
Continuous since infection	3

Subsequent pregnancies—

None	9

General examination—

Bones and joints: septic arthritis	1

Pelvic examination—

Nil abnormal	6
Uterine displacement	1
„ fibroid	1
Procidentia	1

Certain *extragenital morbid conditions* were uncovered during the investigation.

Rheumatoid Arthritis (3 cases).—These patients had well-marked lesions. All were receiving treatment for the condition at various hospitals, and admitted relief. All had had hæmolytic streptococcal puerperal infection. One, with severe deformity of fingers and wrists, had developed the arthritis during the course of the puerperal fever. The others, within two years after discharge from the isolation block.

Rheumatic Heart Disease (2 cases).—Both showed signs of mitral disease with fairly good compensation. One, aged 22, had had an attack of rheumatic fever nearly two years after the hæmolytic streptococcal puerperal infection (septicæmia). The other had shown no sign of a cardiac lesion during her period of treatment at the isolation block, but described having had chorea in childhood. The puerperal infection in her case had been an acute endometritis and pyelitis, the infecting organism being predominantly *Bacillus coli*.

Pulmonary Tuberculosis (2 cases).—Neither had shown signs of lung disease at the isolation block. One developed phthisis in the second, and the other in the third year after discharge. Both received sanatorium treatment and are free from active symptoms. They had been warned against pregnancy, and instructed in correct contraceptive procedure.

Disseminated Sclerosis (1 case).—The history suggests that the disease began in adolescence, and is pursuing the expected course.

DISCUSSION

It was hoped that this investigation would throw valuable light on the damage and deformity that might be expected as a residue of severe infection of the genital tract. It is seen, however, that the pelvic findings are on the whole negative, and not fairly to be held responsible for the rather wretched and "gynæcological" aspect of most of the women that I examined.

A notable number of cases in every group showed no gross lesion of the pelvic organs. After careful examination, per speculum and bimanual, 87 cases had no evidence of tubal masses, uterine displacements, cervicitis, or vaginitis.

Cervicitis was present in 5 cases only, and this is remarkable when one considers how often severe pelvic cellulitis accompanies deep tears of the cervix. One case was frankly gonorrhœal.

Tubal or tubo-ovarian masses were found in 2 cases, both in the pelvic peritonitis group. In one of the cases, during treatment in the isolation block, there had been reason to suspect an antenatal tubal affection. It is possible that the distinctly thickened tube now palpable is a relic of that state rather than of the puerperal infection. The other patient complained of backache, dysmenorrhœa, and a dragging pain on the side of the tubo-ovarian mass some days before the monthly period. Neither had conceived again.

Fixed retroversion with no other lesion or symptom was found in 2 cases, one of whom had carried a pregnancy to full term eighteen months before examination. Procidentia likewise was present in 2 cases. One patient, an elderly and multiparous woman, had had a child since the puerperal fever, and dated the prolapse from this later pregnancy. The other, a flaccid, atonic creature who had had a severe second-degree tear at the delivery of her first and only child, and was repaired six months after discharge from the isolation block, complained of stress incontinence, and had a well-marked vesicocele and rectocele.

As the investigation proceeded, therefore, my interest was narrowed upon what was emerging as the most appreciable abnormal residuum of the original puerperal infection in the large majority of the cases examined—namely, sterility. *Among 100 women during 4–5 years of the active childbearing*

period, there had been only 5 pregnancies and only 4 live births.

Failure to conceive may of course be conditioned by a number of factors other than damage to the reproductive tract by puerperal sepsis, and in view of the largely negative findings under that heading, these other factors were examined under three headings.

(*a*) *Contraceptive measures* were found to be widely but haphazardly employed. The methods used to check conception ranged from the complete abstinence of one patient (a woman on the verge of dementia præcox) through quinine pessaries, coitus interruptus, "safe period" intercourse, to obstructive appliances of more or less efficacious type. Of the 95 "sterile" women, 26 had used no contraceptive whatever, 9 being anxious to conceive, because of the loss or the loneliness of an only child; the remainder were indifferent to the possibility of pregnancy, but on the whole inclined to enjoy the accident of sterility. Of the 69 women using contraceptives, only 22 could be described as using their chosen methods with the care or discretion necessary for success. The rest relied on measures that in the normal woman largely fail to protect against conception, or used these only now and again.

(*b*) *The interval that may be supposed normally to elapse between pregnancies* was estimated from a "control" group of 38 multiparous women, of roughly comparable age and social (economic) level, treated in the isolation block during the past five months. It was found that the average interval between the first and second child is 2¾ years; and between the second and third 3¼ years. The extremes in the group were 7 years in one case, and 11 months in two.

(*c*) *Subsequent pelvic infection.*—One patient acknowledged and showed clinical evidence of a gonorrhœal infection contracted since the puerperal fever. She had a chronic cervicitis and bilateral tubal masses.

Excluding the cases dealt with in these categories, there remained the large number of women who in the absence of gross pelvic lesions remained infertile for 4–5 years following a severe puerperal infection. These were more closely examined.

Of the 9 women anxious to achieve pregnancy, 7 fell into Group 3, the "peritonitis (pelvic and diffuse)" group, which thus appears to be the least residually fecund, if one excludes Group 4, the septicæmia group of 19 patients who one and all desired no repetition of their childbearing experiences, and appeared to be, with few exceptions, "ladies that have intelligence in love" sufficient to avoid its consequences. Fallopian tube involvement is probably most commonly found as the result of peritonitis, and only unusually of extension by direct continuity from an acute septic endometritis. It is often impossible to diagnose tubal masses in the acute stage of puerperal infection if they are associated with peritonitis, and, in this investigation, have been classed in the peritonitis group when suspected clinically. Probably permanent sterility is most likely to occur in this group, although the absence on examination of palpable evidence of tubal damage remains a fact that somewhat disturbs this conclusion. And it is only equally plausible to argue that sealing of the uterine end of the tubes in the course of a septic endometritis, as apart from the endosalpingitis of a gonorrhœal infection, happens very frequently, and is the cause of sterility in such cases.

It is fascinating to speculate on the results of lipiodograms to test the tubal patency of such a series of sterile women, and in the absence of such research, the causes of the widespread sterility uncovered in my investigation must remain a matter of hypothesis only.

SUMMARY

1. Some psychical and physical debility is a common post-natal finding in women living at a low economic level.

2. Complete restoration to normal health may be expected for the large majority of women recovering from severe puerperal infection.

3. Some morbid conditions uncovered during this investigation appear to bear a close relation to the original puerperal infection, notably rheumatoid arthritis and mitral valvular disease.

4. This investigation shows that sterility is a prominent sequel to puerperal infection. It is not an invariable result, and must be described as dependent to some extent upon extrinsic factors such as subsequent pelvic infections, the "natural" interval between pregnancies, and the wide dissemination of contraceptive knowledge among the population. In the absence of any general evidence of gross pelvic damage, it is not possible to relate the sterility to any specific lesion of the genital tract.

I wish to acknowledge my indebtedness to Dr. Leonard Colebrook who encouraged this investigation; and to the members of the honorary staff of Queen Charlotte's Maternity Hospital who kindly allowed my use of case records, and gave me helpful advice on procedure, deductions, &c.

THE THERAPEUTIC ACTION OF *p*-AMINOBENZENESULPHONAMIDE IN MENINGOCOCCAL INFECTION OF MICE

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Buttle, Gray, and Stephenson (1936) have reported in this journal that *p*-aminobenzenesulphonamide protects mice against experimentally induced meningococcal septicæmia. The degree of protection, and the most suitable method of administering the drug, have now been more fully investigated.

TECHNIQUE

Infection of mice.—Mice were infected with virulent meningococci according to the method described by Miller (1935), and more fully by Miller and Castles (1936). Strains were kept on a phosphate-buffered meat infusion agar medium similar to that described by Miller (1935); they were subcultured daily, and a five to six hour culture was used for infection. The culture was removed from the slope with a wire loop, suspended in physiological saline and adjusted to an opacity corresponding to one thousand million organisms per c.cm. A tenfold dilution was made in 5 per cent. mucin suspension, from which further culture dilutions, also in mucin suspension, were made on a one hundred-fold range. The mucin used was Granular Mucin (hog's gastric) obtained from the Wilson Laboratories, Chicago; other brands were tried and found unsuitable. A 5 per cent. suspension in distilled water containing 1 per cent. glucose was sterilised by steaming and adjusted to *p*H 7·3 with normal sodium hydroxide and used as the suspending fluid. The meningococci were injected intraperitoneally into mice in 1 c.cm. of mucin suspension, the injections being performed within half an hour of the preparation of culture dilutions.

Administration of drug.—The drug has been given subcutaneously and by the mouth. The subcutaneous injections were made with a 2 per cent. solution of the drug in distilled water, it being necessary to warm to about 40° C. in order to effect solution at this concentration. A 10 per cent. suspension of the drug in distilled

water containing approximately 3 per cent. gum acacia as a stabilising agent was used for oral administration. Intraperitoneal injection was not used owing to the higher toxicity of the drug when given by this route and intravenous injection was not suitable for amounts greater than 10 mg. owing to the low solubility of the drug (2 per cent. at 37° C.).

EXPERIMENTAL

Mice infected with a mucin suspension of virulent meningococci die from a meningococcal septicæmia within three (usually two) days, the time of death depending upon the number of infecting organisms. The appearance of mice dying from meningococcal infections has been described by Miller and Castles (1936), and is similar to that of mice dying from streptococcal or pneumococcal infections, no symptoms indicating meningeal involvement being observed.

Degree of protection obtained with p-aminobenzenesulphonamide.—Table I. shows the protection obtained with *p*-aminobenzenesulphonamide against varying numbers of meningococci of a virulent Group II. strain; the drug was given in different amounts by the subcutaneous and oral routes.

It will be seen that the drug will protect against a million lethal doses of meningococci when it is given under optimal conditions as in Experiment No. 8. In this case, 7 out of 10 mice infected with one hundred organisms died, and all the treated mice receiving one hundred million organisms survived. There is little difference in the degree of protection obtained when the drug is given by the oral or subcutaneous route. Protection has never been observed against a dose of one thousand million organisms.

The most suitable dose of *p*-aminobenzenesulphonamide appears to be 10 mg. subcutaneously, or 25 mg. orally given immediately, and repeated five and twenty-four hours after the injection of organisms.

TABLE I

Showing protection obtained against the same strain with various doses of p-aminobenzenesulphonamide given subcutaneously and orally.

Numbers indicate mice surviving one week out of groups of ten mice injected.

Treatment.	Treated.			Untreated controls.				Mucin controls.
	Number of organisms injected—							
	10T	M	100M	100	10T	M	100M	—
(1) 10 mg. subcutaneously immediately after injection of organisms	10	10	6	2	2	0	0	10
(2) 10 mg. subcutaneously immediately and 5 hours later	10	10	7	2	0	0	0	10
(3) 10 mg. subcutaneously immediately and 18 hours after	10	9	7	6	2	0	0	10
(4) 10 mg. subcutaneously immediately, 6 hours later and on two successive days	10	10	9	8	2	0	0	10
(5) 5 mg. immediately and 5 hours later	10	7	2	2	3	0	0	10
(6) 25 mg. orally immediately	10	8	6	3	0	0	0	10
(7) 25 mg. orally immediately and 5 hours later	10	10	6	1	0	0	0	10
(8) 25 mg. orally immediately, 5 hours and 24 hours later	10	9	10	3	0	0	0	10
(9) 50 mg. orally immediately and 5 hours later	7	9	6	1	0	0	0	10

10T = 10,000
M = 1,000,000

With larger doses of the drug the combined action of drug and mucin makes the mice very ill, and a few fail to recover. Mucin alone has little effect on the mice.

Meningococci can be isolated from the blood of all the untreated animals which die, but it is seldom possible to isolate meningococci from the blood of moribund treated animals which have received an infecting dose of not more than one hundred million organisms. This probably indicates that in the case of the few treated animals which die the course of infection has been checked although their resistance has been so lowered that death ensues even in the absence of septicæmia. In isolating meningococci from the blood, the technique described by Miller and Castles (1936) has been followed.

TABLE II

Showing the protection obtained against the same strain when the first dose of drug was given immediately, two, five, and eighteen hours after the injection of organisms.

Numbers in table indicate mice surviving out of groups of ten.

Treatment.	Treated.			Untreated controls.				Mucin controls.
	Number of organisms injected—							
	10T	M	100M	100	10T	M	100M	—
25 mg. orally immediately, repeated 5 and 18 hours later	10	9	10	3	0	0	0	10
25 mg. orally 2, 7, and 20 hours after infecting organisms	10	8	1	2	1	0	0	10
25 mg. orally 5, 18, and 25 hours after infecting organisms	7	6	0	6	0	0	0	10
25 mg. orally 18, 23, and 36 hours after infecting organisms	1	0	0	1	1	0	0	10

It is not necessary to keep mice under observation for more than a week, for late deaths due to meningococcal infection do not occur. Treated mice have been kept under observation for a month and remained quite healthy.

Effect of giving the drug at various times after the injection of meningococci.—A very much lower degree of protection is obtained if the administration of the drug is delayed for a few hours. Table II. shows the results obtained when the course of injections of the drug was started immediately, and two, five, and eighteen hours after the injection of organisms.

When the drug was given immediately after the injection of culture almost complete protection was obtained against varying numbers of meningococci up to one hundred million organisms. If the administration of the drug was delayed for two hours no protection was observed against an infecting dose of one hundred million organisms. It was observed that blood cultures from these mice which were not protected were positive before the drug was given. Good protection was obtained against an infecting dose of ten thousand and a million organisms. The blood cultures from these mice were negative before the injection of the drug. A much poorer protection was obtained if the giving of the drug was delayed for five hours and by this time the blood culture from most of the mice had become positive. A few of the mice having a positive blood culture were protected by the drug. No protection was observed if the administration of the drug was delayed for

eighteen hours. By this time a number of mice were dead or moribund, and the blood cultures from all living mice were positive.

Protection against different strains.—The protective action of the drug has been tested against six different strains of meningococci; the results have been summarised in Table III. It appears that the drug

TABLE III

Showing protection obtained with six different strains of meningococci. All mice received 25 mg. orally immediately, five, and eighteen hours after injection of organisms.

Numbers in table indicate mice surviving out of groups of ten.

Strain.	Group.	Treated.			Untreated controls.				Mucin controls.
		Number of organisms injected—							
		10T	M	100M	100	10T	M	100M	—
M. 393	I.	8	10	6	10	2	0	0	10
M. 398	II.	10	10	6	9	8	3	1	10
M. 406	I.	10	10	3	7	1	0	0	10
M. 407	I.	10	10	5	8	6	0	0	10
M. 409	II.	10	10	6	4	0	0	0	10
M. 410	II.	10	9	10	3	0	0	0	10

protects equally well against strains belonging to Group I. and Group II.

Comparison of the type of protection obtained against streptococcal and meningococcal infection in mice.—In view of the fact that the effect of *p*-aminobenzenesulphonamide on streptococcal infection in mice has been extensively studied, some comparison of the protection obtained against this organism and against the meningococcus appears desirable. Buttle, Gray, and Stephenson (1936) have shown that with streptococcal infection of mice, protection can be obtained against ten thousand lethal doses of a highly virulent strain, this protection being independent of the Griffith type of the streptococcus. Also, in order to obtain complete protection, the drug must be given daily for fifteen days after the injection of organisms. As Levaditi and Vaisman (1935) state that streptococci survive in the spleens of treated mice up to the eighth day after infection it seems probable that this continued administration of the drug is necessary to eliminate these localised organisms and prevent them setting up a generalised septicæmia. Nitti and Bovet (1935) have shown that it is not possible to protect against large numbers of organisms of a comparatively avirulent strain of streptococcus.

With the meningococcus, a slightly higher degree of protection is obtained—namely, under optimal conditions, against a million minimal infecting doses of organism. It is unnecessary to continue the administration of the drug for several days, possibly because the meningococcus, unlike the streptococcus, is incapable of establishing a local focus of infection. As with the streptococcus, protection is obtained equally well against organisms of different serological types, and it does not appear possible to protect against more than a certain number of organisms, irrespective of the virulence of the strain.

DISCUSSION

The foregoing experiments show that the early oral administration of *p*-aminobenzenesulphonamide prevents the development of septicæmia and death in mice infected with meningococci. In man the spread of infection from the nasopharynx to the meninges is most probably via the blood stream; the prophylactic use of the sulphonamide in epidemics seems, therefore, worthy of consideration.

There is some evidence that *p*-aminobenzenesulphonamide administered orally reaches the cerebro-spinal fluid. *p*-Aminobenzenesulphonamide as shown by Colebrook, Buttle, and O'Meara (1936) inhibits the growth of streptococci in blood and culture medium. It has been found that the cerebro-spinal fluid taken from rabbits which have received large doses of the drug inhibits the growth of a small inoculum of streptococci whereas a similar number of streptococci grow freely in the normal fluid. (To facilitate growth, a little human blood is added in both cases.)

In established cases of meningococcal meningitis in man the conditions may not be comparable with those following intraperitoneal injection of culture into mice. The results of the mouse experiments, however, together with those obtained with the cerebro-spinal fluid in rabbits, suggest a clinical trial of *p*-aminobenzenesulphonamide even when meningeal involvement has already occurred.

SUMMARY

1. *p*-Aminobenzenesulphonamide given immediately after infection protects mice against approximately a million minimal infecting doses of meningococci.

2. Protection is equally effective against Group I. and Group II. meningococci.

3. When the administration of the drug is delayed for several hours after the injection of organisms a much lower degree of protection is obtained.

My thanks are due to Dr. G. A. H. Buttle and Dr. H. J. Parish, under whose guidance this work was carried out.

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THE PLASTER BED

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AND

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THE making of plaster beds is such an ordinary part of surgical practice that the description of any method calls for some explanation. This is to be found in the fact that although the technique to be described is not original, and has long been in use at a few hospitals besides the Royal National Orthopædic Hospital, we think that its merits deserve wider appreciation. The method is usually attributed to Prof. J. Waldenström of Stockholm, but in a personal communication from him we learn that while it probably reached England from his clinic, he himself first saw it employed by Calot at Berck-sur-mer.

MATERIALS

1. Plaster muslin, 32 threads to the inch (a material of constant quality may be obtained from the Stanmore Cripples Training College). Ten to twelve doubled sheets

of this are cut beforehand to the patient's measurements—i.e., for a bed, the patient is measured from the nasion over the vertex to halfway down the calf; for an anterior shell, from the nasion to halfway down the calf. In either case, the width is the distance between the tips of the elbows when the arms are abducted to 90°.

2. Plaster-of-Paris, 10 lb. (Terrey's superfine Italian).

3. A basin holding 12 pints of water at 120° F., and an iron spoon for mixing.

FIG. 1.—Position for plaster bed.

4. A table of suitable height, covered by a rubber mattress.

5. Vaseline; 2 in. open-wove bandages and cotton-wool.

6. An adjustable theatre stool and sandbags.

7. Scalpels for outlining, and knives (linoleum knives with concave blades and wooden handles) for cutting out the cast.

PREPARATION OF THE PATIENT

For a plaster bed the patient lies prone on the table, with the chin resting on the edge, arms abducted to 45°, and each leg abducted to 15° (Fig. 1).

For an anterior shell, the patient lies on his back with legs and arms arranged as for a bed. The neck is allowed to hyper-extend over the edge of the table until the under surface of the chin is horizontal (Fig. 2). The head is supported in this position by a sandbag resting on the adjustable stool, and the face is covered with a sheet of gauze. A capeline bandage, or a rubber cap completely covers the hair, and in the case of a plaster bed, pads of wool over the ears are included to make the finished headpiece more roomy. A very thin layer of vaseline is smeared over the skin down to the middle of the calf, and a minimum of wool used to cover the pubic and perineal regions.

PROCEDURE

A team of five, familiar with their parts, is the ideal, but the number may be reduced to three. The first assistant makes the plaster cream by adding the 10 lb. of plaster powder to the 12 pints of hot water, and then whipping the mixture to an even consistency with the spoon. The second assistant hands successive double sheets by their folded ends to the first assistant, who dips them thus into the cream. The sheets, now like ropes, are lightly stripped of excess cream and are handed quickly and still by the folded ends to the other three assistants, who are disposed about the table as follows: the third stands at the head of the patient, the fourth and fifth on either side of him near the knees. The three open out the sheet, pull it taut to remove creases (Fig. 2), let it fall squarely on to the patient, and then smoothe away air bubbles from the midline outwards. The fourth and fifth assistants, as each sheet is laid, press it firmly down to the table between the thighs and perineum, so forming a flat bridge connecting the gutters for the legs. The excess muslin—except in the first and last sheets which determine the internal and external finish of the cast—is folded back at the level of the knees on to the thighs. At the sides the sheets must not be moulded under the patient as this would cause difficulty in removing the cast. For children it is unnecessary to strengthen the sides by folding back the excess, but for adults every second sheet should be so treated.

FIG. 4.—Finished anterior shell before mounting.

If a bed is being made, the third assistant standing at the head folds back the excess of the eight to ten intermediate sheets at the vertex and in front of the ears, moulding it accurately to the back and sides of the neck. If a shell is being made, the intermediate layers are folded back along the symphysis and rami of the mandible, and moulded back along the front of the neck to form a strong horizontal chin-piece. The assistants then wash their hands free of crumbs of plaster, and produce a good finish by firmly smoothing the cast from the centre outwards to eliminate air bubbles.

Speed is essential for a good result, as the warm plaster cream sets very quickly. The procession of sheets must follow without break, and all must have been laid within, at the most, five minutes. The cast is now allowed to set (Fig. 3) until it gives a

FIG. 2.—Position for anterior shell, laying on the first sheet.

FIG. 3.—Outlining the nursing area of an anterior shell while the cast is setting.

high-pitched note on tapping. While this is happening, the outlines are marked with a sharp scalpel, the sides an inch from the table level, the shoulders in line with the sides, and the upper and lower edges at the level of the folding back. An area for nursing purposes is outlined (Fig. 3), extending in a bed from the top of the natal cleft, or in an anterior shell from

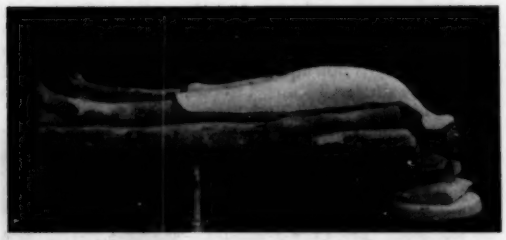

FIG. 5.—Trying on an anterior shell after trimming.

an inch above the pubic crest (Fig. 4) to midway between the perineum and the knee on either side, exposing one-third of each thigh. In a bed, care is taken to make the opening a pointed arch so that the buttocks are adequately supported. When the cast has set, it is eased off all round by insinuating a hand between it and the table, and is then taken to another table where the outlines already marked are quickly cut through with the knives described. It is then tried on the patient (Fig. 5) and any necessary trimming carried out. From start to finish the whole proceeding should take not more than fifteen minutes. The cast is dried for two days in a heated room. When thoroughly dry, it is mounted by a carpenter on three shaped transverse supports of 1 in. timber, high enough to allow the

FIG. 6.—Method of mounting.

easy insertion of a bed-pan. These uprights are affixed by countersunk screws at the neck, lumbar region, and above the knees, and joined by two lateral 3-in. strips of three-ply wood giving a considerable area for contact with the mattress (Figs. 6 and 7). A loose lining is made of linen sheeting and thin blanket sewn together along the edges, having an area cut out to correspond to the nursing area of the plaster cast, and held in position by tapes.

MODIFICATIONS

The bed and shell described are the standard types in use at Stanmore, but many modifications are possible.

1. In cases of spinal disease when the lesion is below Th 6, the headpiece may be omitted from a bed; in high lesions the head is always included.

2. In active children, movements may be restrained by means of a wooden crosspiece shaped to the chin and bolted to two uprights (see Fig. 8).

3. When a kyphosis exists at the scapular level, a quadrilateral area may be cut out of the plaster bed, and local pressure applied by a split Sorbo pad mounted on a wooden tower. This is pushed through the cut-out area to rest against the spine above, and supported by a cross board on the firm mattress below.

4. A sharp kyphos can be protected by pads of Sorbo glued to the inside of the bed.

5. For adults, anterior shells may be made without chin-pieces, but children find these comfortable, especially for reading.

6. For cases with profusely discharging abscesses, areas should be cut out to allow free postural drainage.

7. For thin patients, particularly when paraplegic, areas may be cut out to expose the anterior superior spines and iliac crests.

FIG. 7.—A plaster bed from above showing supports (wider than usual) and ventilation holes in the headpiece.

8. For ease in transport, the three-ply laths may be replaced by longer two by two inch timber with the ends fashioned as handles.

9. Turning cases for use with plaster beds may be made as for a very shallow anterior shell without chin-piece or bridge.

INDICATIONS FOR USE

PLASTER BEDS

1. Tuberculous spines in adults.
2. All cases with paraplegia.
3. Abdominal paralysis in anterior poliomyelitis.
4. Some cases of fracture of the spine—e.g., complicated by paraplegia.
5. Tumours of the vertebræ.
6. Post-operative nursing of cases of spinal fusion.
7. Transport of medical and surgical cases requiring immobilisation in recumbency.

ANTERIOR SHELLS

1. In the intermediate stage of treatment of tuberculous spines in children, after hyperextension on Bradford frames, to allow collapse of vertebræ and development of compensatory curves.
2. For cases of paraplegia.
3. Post-operative treatment of laminectomy.
4. For the nursing of incontinent cases, such as spina bifida, when the cast may be waterproofed with varnish or Pexuloid.

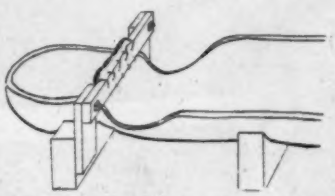

FIG. 8.—The restrainer attached to a plaster bed.

CONCLUSION

Plaster beds and shells made by this method have the following practical advantages: (1) they are made in 10–15 mins.; (2) they dispense with the need for preparing many plaster bandages; (3) they are of even texture and good finish; (4) they are light—a bed for an average adult weighs 5½ lb., unmounted; (5) the mounting facilitates nursing and transport,

and with the accurate moulding obtained, the adult patient needs to be turned only once a month, and pressure sores occur very rarely; (7) they are durable—a bed generally lasts twelve months.

Our thanks are due to the medical committee of the Royal National Orthopædic Hospital for permission to publish this account; to Miss Williams, matron at Stanmore, for many helpful suggestions; to Dr. C. W. Durward, for his pains with the photography; and especially to Mr. H. J. Seddon, for his excellent teaching, and his invaluable aid in the production of this paper.

RAPID AMBULATORY TREATMENT OF SCABIES WITH A BENZYL BENZOATE LOTION

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It is very important that the treatment of a disease such as scabies in the first place should be ambulatory and inexpensive, and secondly, it should not irritate the often already scratched skin of the patient. It seems usual in France and America to regard scabies as a disease necessitating a stay in hospital, if one can judge from the descriptions given in dermatological journals. MacKenna (1933) appears to calculate that 5–8 days are required for a cure and he regards treatment by Mitigal as being the simplest, and states that it will cure an average case of scabies in 10 days. Roxburgh (1936) recommends the treatment of scabies by Kathiolan which is said to produce a cure in 24 hours, or by sulphur ointment which takes three days.

In the skin department of the Kommunehospital we treat between 2000 and 2500 cases of scabies in a year by a method that can be carried out in one hour. Formerly we used the kathiolan of Ehlers-Marcussen, a method of treatment which saved the patient many days' stay in hospital and gave very good results. This treatment, however, as with all sulphur remedies, often caused an extremely disagreeable sulphur dermatitis. In 1932 therefore I introduced treatment by benzyl benzoate. It was first tried some 25 years ago by Ludvig Nielsen with great success. With the help of the hospital dispenser we improved the formula of the benzyl benzoate lotion and simplified the method of treatment so that it could be carried out in 45 minutes without causing any damage to the skin. Since January, 1933, we have not used any other method and we have treated some 8000 cases of scabies in which it has proved practically ideal.

The whole treatment takes less than one hour, and is an ambulatory one, only children of under one year having to be treated in hospital. It very seldom gives rise to any dermatitis or irritation of the skin and even cases of scabies pyogenically infected, and very young children, can be treated without any serious after-effects. It is an inexpensive treatment costing about 6*d*. per head for the clinic patient and 2*s*. per head for private patients.

METHOD

The formula consists of equal parts of :—

Soft soap (B.P. 1932).
Isopropyl alcohol
$(CH_3)_2$ CHOH
Benzyl benzoate
$C_6H_5.COOCH_2.C_6H_5$

The quantity necessary for each patient is about 150 grammes. The patient anoints the whole body with soft soap, rubbed with special care into those parts commonly attacked by the acarus. He then soaks in a warm bath, at 100° F., for 10 mins., rubbing himself during the bath. While wet the body is brushed all over with the lotion for 5 mins. using a brush of Russian pig bristle, special attention being paid to the affected parts. The patient then rests, allowing the body to dry and then continues the brushing for a further 5 mins., after which the body is gently dried with a towel and the patient resumes the clothes worn before the treatment was started. Twenty-four hours later a second bath is taken and clean clothes put on. Underclothes are not disinfected but only washed and if possible boiled. Bedclothes should be boiled or otherwise sterilised. It is very important that all members of a family or household should be treated on the same day even though they may not show any signs of scabies.

We have treated some 8000 cases of scabies in this way and it has proved to be an ideal, effective, and cheap method giving rise to no serious post-therapeutic dermatitis.

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MENTAL CHANGES IN FAMILIES AFFECTED BY DYSTROPHIA MYOTONICA

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AND

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This paper is a preliminary report of an investigation into the mental symptoms occurring in patients with definite signs of dystrophia myotonica, and in members of their families. Chiefly through the courtesy of the honorary physicians to the National Hospital, Queen-square, and particularly Dr. E. Arnold Carmichael, Director of Research, we have been able to examine 29 such persons. On the result of the neurological examination (O. M.) they were divided into three groups: (1) those who were seriously affected by the disease, to the extent of being incapacitated either by paralysis or by cataract; (2) those who showed definite signs of the disease, such as wasting of the hand muscles, together with the characteristic myotonic reaction in these muscles; and (3) relatives who were wholly or almost free from physical signs. In each case as thorough a psychiatric examination as possible was made (A. S. P.).

THE FINDINGS

Innate Intelligence of Patients.—Of the 29 patients, 4 adults were congenital mental defectives, their mental ages being nine, seven, six, and six. In addition 7 had been backward at school; they had not been sufficiently defective to be sent to a special school, but were about two years behind other children. The remaining 18 appeared to have school records that were average or above average.

Intellectual Deterioration.—An attempt was made to determine whether any patients, normal at birth, had later deteriorated intellectually because of the disease. Of the 7 backward patients only 2, a woman aged sixty and a man aged fifty-six, showed signs of much mental deterioration since school days; this

deterioration was mainly in their memory. Of the 18 who at school had shown intelligence which was average or above average, 14 were over twenty, and 7 of these showed distinct deterioration when tested for recent memory, capacity for doing simple calculations, immediate recall, and grasp of a simple story.

Muscle Wasting in Relation to Mental Changes.—In our first group which included all those with severe affection of the muscles, 3 were congenital mental defectives, 6 were backward at school, and 3 more, although they had been normal at school, had later deteriorated in respect of memory, &c. Thus among the 13 severely affected physically there was only 1 whose intellectual deterioration was doubtful, and the group included 3 patients, with hysteric, paranoid, and epileptoid symptoms. Of the second group—those with slight muscular wasting—3 had deteriorated in intelligence, and 3 showed other mental changes (2 were chronically elated and 1 had schizoid symptoms). Thus 6 were affected mentally and 6 were unaffected. Of the third group—those with no definite muscular changes—3 were affected as regards intelligence (1 was a congenital mental defective, 1 was backward, and 1 deteriorated in later life). The other 4 were unaffected mentally.

It may be concluded then that mental changes are almost always present where there is much muscular wasting. Where the muscular changes are less pronounced, there may or may not be pronounced mental change.

Temperament.—A characteristic temperament was apparent in nearly all the cases, whether there was mental deterioration or not. The patients were persistently and almost morbidly cheerful, and usually somewhat condescending. This state of mind was seen in cases with little or no intellectual change, and the trait was exaggerated in two of them into a state resembling chronic hypomania. None of the patients examined were described by relatives as irritable or quick-tempered, except 3 of the 4 mental defectives; and even they were on the whole quiet and well behaved.

Reaction Types.—Despite a certain similarity of temperament in all these patients, there were some whose symptoms recalled those of the classical reaction types.

1. *Schizoid Type.*—A man aged 22, with mild muscular changes. Two years previously he had begun to lose interest in things and became seclusive. He was conscious of muscular weakness, and he had been impotent since the age of 16. He was unemployable, for he was casual, slow, and inefficient. There was no trend and no voices. There was good rapport, and he was persistently cheerful and happy.

2. *Paranoid Type.*—Man aged 50, with gross muscle changes. After 16 years of married life he left his wife in the belief that she was a prostitute, which was untrue. He still tried to keep on friendly terms with his wife after taking up with another woman. He was an able man and head clerk in an insurance company.

3. *Epileptoid Type.*—Man aged 54, with gross muscle changes. After marriage at 28 he began to have atypical fits when his head would suddenly fall forward and he would remain motionless for a minute or two with his tongue out. He had a cheerful disposition and was somewhat demented.

4. *Hypomanic Type.*—There were two of these. One was a woman of 65 who was severely affected in her muscles. She had lost her sight in an accident when 22. She was persistently mildly elated, and was called "Sunshine." She always believed her sight would be restored. She called the doctors "My Lords," and said she would give them 20 guineas for some small errand.

5. *Hysteroid Type.*—A man aged 35, showing severe muscle changes. He was backward at school and later did odd jobs. He was popular at spiritualistic séances where he "saw the words written up," and also "astral bodies." He thus enjoyed the limelight and his belief in his own supernatural powers.

DISCUSSION

Poor intelligence has often been described in dystrophia myotonica (Adie and Greenfield 1923, Bramwell and Addis 1913, Curschmann 1925, Baake and Voss 1917, Naegeli 1917, Hauptmann 1919). Certain writers (e.g., Hauptmann) have held that it is something accidental, and not germane to the disease, and it has been said that the intelligence is not much below what one would expect in the low social stratum to which the patients belong. From our observations, however, it appears that where a patient has severe muscular wasting his mind is almost always affected also, which suggests that the mental changes are really part of the disease. Where there is less muscular wasting it is less likely that the patient's mind will be affected. As the present series included, for example, a chartered accountant and a scientific photographer among those with intellectual deterioration, this cannot be attributed to the disease occurring in people belonging to the lowest social stratum. The persistent cheerfulness shown was all the more striking in view of the pitiable physical state and dreary surroundings in which most of them lived.

Curschmann (1925) and others have said that serious mental disorder is not characteristic of the disease, and the only case we can find on record is that of Fischer (1920). Among our 29, however, there were 4 patients suffering from serious congenital mental defect; another was diagnosed in a mental hospital as a case of schizophrenia; and we considered that another 6 might have been brought to a physician for an opinion on their mental state. As already stated, 6 patients had symptoms approximating to those of the classical reaction types; but the clinical picture was never quite typical—probably because the reaction to difficult circumstances was occurring in persons with a particular temperament.

Dystrophia myotonica is undoubtedly a disease entity, dependent on a defect which is inherited, and degeneration of certain endocrine glands has been recorded. It is therefore of particular interest to know whether the temperament found in the disease is at all constant, and whether those who show mental changes have any symptoms in common. If this were so, it might be possible in time to correlate the mental with particular physical changes.

SUMMARY

1. Twenty-nine persons from families affected by dystrophia myotonica were subjected to psychiatric examination, and seventeen of them were found to be of low intelligence. In eleven of these the intellectual defect was congenital, four adults being mental defectives with mental ages of 9, 7, 6, and 6, while seven had been backward at school. The remaining six had been normal at school but had since deteriorated.

2. Where there is much muscular wasting, there are almost always mental changes. Where muscular wasting is slight or absent there may or may not be gross mental changes.

3. Six of the twenty-nine presented clinical pictures in some respects resembling classical syndromes of mental disorder. One was diagnosed in a mental

hospital as a case of schizophrenia; one had delusions that his wife was immoral; one had fits and became somewhat demented; one was a hysteric and a spiritualistic medium; and two were chronically elated.

4. The series was not confined to those in the lowest stratum of the social scale, but included several brain-workers. The intellectual enfeeblement was therefore not merely due to unfavourable environment in early life.

5. A definite temperament was found in so many cases as to seem characteristic of the disease. It consisted in persistent and almost morbid cheerfulness, mild grandiosity, and a lack of drive and initiative.

Permission to see cases has been granted us by the honorary physicians to the National Hospital, Queen-square, Mr. Charles Goulden, Mr. T. C. Summers, Dr. Redvers Ironside, and Group-Captain H. E. Burton, R.A.F., to whom we would like to express our thanks. One of us (O. M.) is indebted to the Medical Research Council for a grant which made this work possible. The necessity for the investigation of mental changes became noticeable in the course of his studies in the heredity of the disease.

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POSTURE AND DIURESIS IN THE TREATMENT OF RENAL CALCULI

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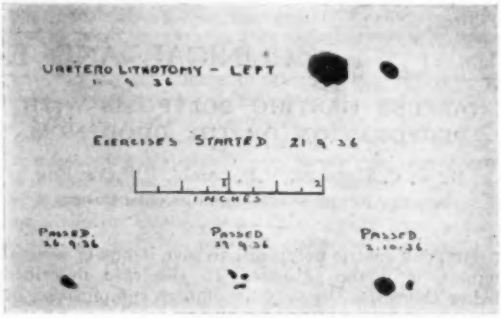
It is common practice to advise patients who suffer from renal calculi to drink large amounts of water; partly in the hope that salts which might be deposited as crystals will thereby be held in solution, and partly to ensure the thorough washing-out of the urinary tract. Such treatment may be used either to prevent the formation of renal calculi, or after a stone has been removed by a surgical operation to prevent the formation of another. It has been pointed out by Swift Joly that in the erect posture each lower renal calyx is undrained by gravity, and although it is unlikely that in health absolute stasis ever exists from this cause, yet it is a fact that renal calculi most commonly take origin in this site, and from small beginnings grow until they fill the lower calyx and then hook over the lower part of the kidney into the uretero-pelvic juncture. It seems clear that if this part of the urinary tract did not have to empty itself uphill renal calculi would not develop so commonly, as the minute deposits of crystals from which they take origin would be washed out when they were still so small that they would readily pass down the ureter.

The other position in the urinary tract where there is a particular tendency for stones to form is in the bladder behind the intravesical projection of an enlarged prostate. This area is also undrained by gravity and is very inefficiently cleared in the act of micturition because in such cases residual urine is commonly present.

I first became interested in posture in relationship to the formation of renal calculi when in 1921 I had under my care a patient with enormous stones in each kidney. He had suffered from gunshot wounds in the lower extremities, for which he had been treated for many months by splints and extension, his feet being kept continuously higher than his head. It seemed clear that the stone formation in this case was the combined result of sepsis and renal stasis.



Renal calculi removed by operation (above) and passed after exercises

METHOD

For a good many years I have been in the habit of encouraging patients, upon whom I have operated for renal calculi, to do more than merely maintain intense diuresis, for I have given them exercises in posture to carry out combined with this. The instructions are as follows: One day out of each week on waking, drink one-third of a litre bottle of Evian, Contrexéville, Vichy, Vittel, or other water, then adopt the following postures, spending five minutes in each:—

(1) Lying flat on the back with only one pillow under the head.
(2) Lying flat on the face.
(3) Lying on the right side.
(4) Lying on the left side.
(5) Kneeling with the knees drawn up to make the thighs vertical whilst the trunk is bent downwards onto the bed, so that you are resting on the upper part of your chest, the head being turned to one side. By this means the body is turned half upside-down.

After resting for five minutes drink the second-third of the bottle, and repeat the postures as before. Then drink the remainder of the bottle, and after a short rest and a short walk take breakfast.

EFFECTS

In a recent case the benefits of such treatment were unusually obvious.

The patient, a man aged 48, in the middle of August had suffered from an attack of severe left renal colic. He had had no other symptoms of calculous disease, nor had he ever had pain referred to the right side of his urinary tract. Radiograms showed in the left uretero-pelvic juncture a single stone about 8 mm. in diameter (see Figure), which was proved by a Uroselectan radiogram to be causing considerable hydronephrosis. In the bottom of the lower calyx of the same kidney was a much smaller stone, 3 mm. in diameter. But it was found that both kidneys were affected with calculous disease, for in the lowest part of the lower calyx of the opposite kidney was one small stone and two others much more minute.

On Sept. 1st the stones were removed from the left kidney by pyelolithotomy, the larger one from the uretero-pelvic juncture, the other by means of forceps dipped into the lower calyx. On Sept. 21st the above-mentioned exercises were begun and performed daily. On the

26th, after an attack of renal colic, on the right side this time, one small and very rough calculus was passed. Further colic on the right side occurred on the 29th, followed by the passage of three small fragments of stone. A radiogram on this date showed the largest calculus from the right kidney to be now held up in the ureter at the level of the right sacro-iliac synchondrosis. This and another piece were passed on Oct. 2nd. A radiogram taken on Nov. 30th shows the urinary tract to be now clear of calculi.

The results obtained in this case demonstrated very clearly the value of this method of drainage of the kidneys by postures, and it seems reasonable to hope that this patient may, if he continues such treatment, avoid the formation of further stones. The most important posture in my opinion is the knee-chest position, which can only be improved upon by those patients who can stand on the head or upside-down on the neck and shoulders.

CLINICAL AND LABORATORY NOTES

DIFFUSE GASTRIC POLYPOSIS WITH PERFORATION OF THE DUODENUM

BY C. C. HOLMAN, M.B. Camb., F.R.C.S. Eng.
SURGEON TO THE NORTHAMPTON GENERAL HOSPITAL

DIFFUSE gastric polyposis, to give it one of several names, is a rare disease. In the case described below there was the very uncommon complication of acute perforation of the duodenum.

The patient, a married woman aged 45, of spare physique, was seen on August 13th, 1935, in consultation with Dr. Morton Kahn. For about a week she had been complaining of abdominal pain of a colicky nature,

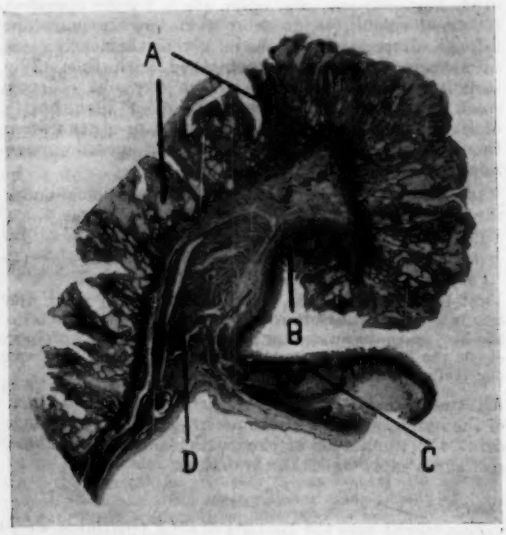


FIG. 2.—Section of mucosa showing A œdematous polypoid mucosa changing abruptly at B to normal epithelium of the cardia (C). D: muscle coat. (× 2½.)

but previously her health had been good. At noon on August 13th she was seized with acute pain referred to the right side of the abdomen. When I saw her she was in great pain, the abdomen was rigid, but an indefinite tumour could be felt to the left of the umbilicus. She was moved to the Northampton General Hospital and, while there, complained of the pain coming on in spasms. Although her condition was suggestive of an acute perforation I was puzzled to account for the tumour. Operation was clearly necessary and was carried out at 6 P.M. On opening the abdomen some extravasation was seen below the liver and a small perforation on the anterior wall of the first part of the duodenum was found and sutured. I then examined the stomach, which felt as though filled with some pultaceous material. To ascertain what was wrong I opened the stomach and a polypoid condition

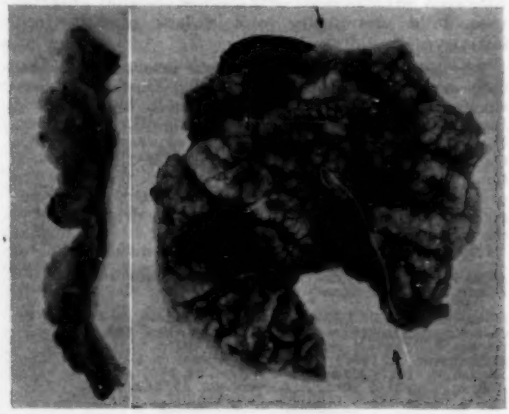


FIG. 1.—The macroscopic appearance of the gastric mucosa, with a section (left) through the part shown by the arrows.

of the mucosa was at once apparent. I closed the incision and proceeded to remove about three-quarters of the stomach, dividing the duodenum at the level of the perforation and the stomach just proximal to the affected portion.

Pathological report.—Approximately three-quarters of the pyloric end of the stomach, opened along the greater curve. Apart from a narrow margin of normal gastric mucosa at the cut edge of the stomach, the whole area is thrown into irregular œdematous polypoid folds up to

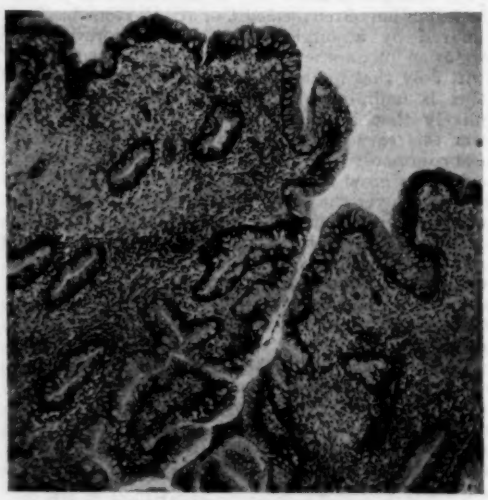


FIG. 3.—Section of the mucosa showing œdema and chronic inflammation of the stroma (low magnification).

1 in. thick. The condition ends abruptly at the pylorus, but the duodenal mucous membrane appears inflamed and congested.

Sections show great thickening of the mucous membrane due largely to œdema and chronic inflammation of the stroma. There is some evidence of proliferation of the glandular structures, which consist of distended tubules lined by tall columnar mucous secreting cells. There is a sharp transition between the affected area and the normal mucosa of the cardia.

Fortunately the patient made a good recovery and was seen in good health 15 months after leaving hospital.

The specimen is in the Museum of the Royal College of Surgeons and I am greatly indebted to the curator, Dr. L. W. Proger, for sending me the photographs and the report.

TROPICAL CHEIROPOMPHOLYX

BY DENIS J. G. FITZ-PATRICK, L.M.

TROPICAL cheiropompholyx is endemic in tropical Africa and probably India. Nothing is definitely known of its cause but presumptive evidence points to an anaerobic bacterium which attacks the palmar and interdigital aspect of the hands and the plantar aspect of the feet. The condition is sometimes acute in those who wear gloves and footgear.

The disease makes its appearance on the hands in the form of vesicles buried in the skin. Irritation and destruction of the epidermis follow, with serous discharge, after which the eruption may (1) fade away, usually to reappear again, (2) cause rawness of the hand, or (3) make its appearance on the feet, causing lameness and great discomfort. The only cases in my experience in which it has healed of its own accord are those in which the sufferers have moved to a more temperate clime. After many failures and temporary successes, however, I found the following a specific: coal tar, 3; powdered coal, 1; zinc oxide, 4; lanolin and vaseline, 12. This ointment is rubbed well into the affected parts, and no occlusive dressings are used, apart from a loose glove or sock to prevent soiling of bedlinen. In conjunction with the above, resorcin soap was used. Every case of tropical cheiropompholyx I have treated yielded within ten days, and I have successfully employed the same treatment for squamous eczema. For the moist types of eczema I use this powder: zinc oxide, 5; powdered talc, 20.

Lourenço Marques, Portuguese East Africa.

MEDICAL SOCIETIES

BRITISH PSYCHOLOGICAL SOCIETY

AT a joint meeting of this society (medical section) with the Institute for the Scientific Treatment of Delinquency on Dec. 16th, 1936, Dr. Edward Glover, chairman of the scientific advisory committee of the Institute, being in the chair, a discussion on

The Unwilling Patient

was opened by Dr. DENIS CARROLL, director of the Institute. He discussed the technical problems arising when a patient who did not wish to be treated was coerced into attending a psychiatrist for the purpose of carrying out a course of treatment. He deliberately excluded from discussion the very large numbers of patients in whom the psycho-analyst recognised unconscious unwillingness. The patient treated under duress might be a delinquent, for instance, a man bound over with treatment as a condition, a man who regarded treatment as punishment or as a means of evading punishment, or a prisoner who agrees to be treated as a matter of discipline; or among non-delinquents might be instanced certain alcoholics, psychotics under certificate, neurotics and character cases manœuvred into treatment by relatives or friends, and many children. He confined his paper to the delinquent, in whom he demonstrated that the lack of desire to get well is of the same nature as that found in non-delinquent patients and consequently the technical problem reduced itself to that of adapting ordinary psychotherapeutic methods to the particular case of delinquents in such a way as to establish a positive drive to treatment.

The special points were first that the lack of desire to get well was often quite conscious or only thinly disguised; second the identification of the doctor with a harsh super-ego was greatly facilitated by the nature of the situation. This might be got over by making a strong positive contact at the first interview and/or by careful choice of the therapist. Other devices were to diagnose the sign and quantity of the initial transference manifestations and so make it possible to plan how to be a "good object" in the Klein sense—e.g., by arranging to appear to the patient as a rescuer from his trouble. Or the delinquency might be treated under the guise of treating some other condition—e.g., a man repeatedly convicted of theft who was ostensibly treated for his lack of self-confidence without any apparent connexion between the doctor and the court. Aggressive impulses and unconscious paranoid anxiety systems played a large part in the psychogenesis of delinquency as in psychosis, the difference being that the psychotic dealt with these problems by flight from reality, whereas the delinquent did so by manipulating reality by his delinquency. He showed how this led to a difficulty in treating delinquents which was not present in psychotics. The types of treatment possible were sociological, physical, and psychological. In the first two of these the difficulty was administrative only; in psychological treatment suggestion and superficial analysis could be facilitated for unwilling patients by deliberately coaxing a positive transference. Such devices precluded deep analysis in which the underlying aggressive and paranoid systems had to be resolved. It meant a long analysis with a long early negative stage, and called for special qualities in the physician, such as deep personal analysis, great patience, and the rare ability not to dislike such patients.

Aim in treatment was important. Radical cure could only be reached by deep analysis and resolution of negative transference; partial cure by stabilisation by sociological methods and suggestion. The latter tended to produce greater inhibition than was present at the outset and was probably one of the ways in which "moral" methods worked. In some cases one might aim at alteration, transmuting the delinquency by partial analysis into an obsessional state. In methods aiming at partial cure duress did not necessarily prejudice the prognosis. None

of the methods were of avail if the physician allowed himself to be identified with the bad restraining parent. Deep analysis was lengthy, and this fact had to be borne in mind in making the initial recommendation to the court. It seemed that psychopathic personalities would *not* stabilise better by non-analytical methods though apparent cures would be easier. Delinquency with neurosis would be easier to stabilise by non-analytical methods than delinquency by itself.

The criteria for deciding on psychotherapy rather than on other methods of treatment for the unwilling delinquent were, Dr. Carroll considered, (1) Age, youth being best, a positive transference had to be present or the means to get it readily available. (2) If a grip were needed, it should be adequate. (3) Last and most important, the possibility of an unconscious drive being found which would induce willingness—e.g., as would be evidenced by a desire for love or by a tendency to use the doctor as a whipping block or as a bolster between say the patient and his relatives. Coercion was, he thought, sometimes desirable. Some patients were too slippery unless forced; in others strong and rapid transference manifestations, apart from a transference neurosis, might make it desirable. It might also be of service if the patient's rôle were complementary to the doctor's—e.g., the presence of a gentle manner in the physician with a timid or effeminate patient. A patient with difficulty in expressing or admitting to himself his angry, persecutory, or jealous reactions to real situations might respond well to force. Coercion might provide an outlet for a masochistic type.

Our knowledge of the treatment of delinquency was, concluded Dr. Carroll, incomplete and he hoped research would be carried out on non-recidivist criminals and into clinical types. He did not think treatment need be more difficult in jail provided the doctor had a free hand without restrictions on secrecy and was able to continue treatment after discharge and provided also that treatment was voluntary and was not identified with punishment or its evasion. He thought compulsion should be more deliberately used or avoided for those on probation than was the present fashion.

TWO TYPES OF UNWILLINGNESS

Dr. W. H. DE B. HUBERT described the initial overwillingness of the delinquent patient who preferred probation, with treatment as a condition, to prison or who considered that while serving a sentence he might derive from treatment special consideration from authority or feel relieved of his sense of guilt at being punished by society because he believed that treatment implied that he was ill. When the disadvantages of treatment had been encountered he would tend once more to show "unwillingness" towards his physician as he had shown by his previous behaviour his "unwillingness" towards society. The unwillingness of the patient to be treated for functional nervous disorder apart from delinquency was not so much an attitude towards the physician as a member of society but was often an illogical reaction forming part of the total reactive pattern which made up the patient's illness. The speaker took as examples of these two types of unwillingness the homosexual and the schizophrenic patient.

In discussing the view that there was a congenital and absolute tendency towards homosexuality in at least a portion of that type of patient Dr. Hubert said that isolation from the opposite sex showed the large part played by circumstance in the development of homosexuality; but, from careful observation of a large number of cases, several authorities had agreed upon an irresistible congenital determinant towards it; more recent authorities, starting with Freud, introduced the psycho-dynamic point of view; while admitting a congenital factor varying in different cases they found evidence also of such a tendency in everyone and demonstrated particular psychological mechanisms in early life which allowed the tendency to operate. Unwillingness in patients of this class therefore might not only be a very cogent argument but also, in a totalistic sense, a deep-seated biological unwillingness.

In society the powerful factor set against homosexuality, against which the patient showed his unwillingness, consisted of two parts: the religious and moral aspect and the concept of anti-social behaviour defined in a particular legal code. These were sometimes erroneously assumed to be the same. Homosexuality appeared first in legal code in Roman law of the fourth century when the penalty of vindices flammæ was fixed. Modern criminological views were derived with modifications from that, but a turning point in attitude occurred in France at the time of the revolution. The nations might now be divided into two groups, in one, which included England and the United States, homosexuality was condemned in toto; in the other, which included France, Belgium, Italy, and Japan, homosexuality was not punished except in special circumstances. The variation in legal code appeared to have little influence on the prevalence of the condition. These various factors provided the patient with a classical tradition which gave him justification for his attitude. In dealing practically with a case one had difficulty in knowing at what result one was aiming and one might regard the patient's unwillingness as the point at which one could see in condensation a historically developed behaviour anomaly up against its logical counterpart. The differences in social relation and in attitude towards treatment in the female homosexual was also discussed.

Homosexuality had to be viewed as a behaviour reaction resulting, first, from a biological anomaly; secondly, a complex personal development; thirdly, the peculiar position society had evolved as his environment. While it was too early to speak definitely, evidence was collecting which would probably allow the definition of various classes of homosexuals on the basis of their types of total behaviour anomaly, of which overt homosexuality was but a part. Then the factor of unwillingness would be much more clearly defined. One might then hope to see clearly (1) in what cases no psychological modification could be hoped for, (2) when the general behaviour reaction could be altered by therapy to help the individual in his relationship to society, and (3) in what cases a heterosexual development might be attained.

In his other example of an unwilling patient Dr. Hubert described the change in imagery and thought process in terms of function analysis which he had observed in a case of schizophrenia occurring at the same time as a change from a willing to an unwilling attitude, which seemed to indicate the mechanism by which such an alteration could occur in a large group of patients suffering from this disorder.

DISCUSSION

Dr. O. H. WOODCOCK said that though there were drawbacks to classification he thought that among

unwilling patients some groups stood out. There were the sullen silent type and the garrulous who kept up a constant flow of talk away from the point. Then there were the persistently innocent who maintained that there was mistaken identity and the really sensitive with a pronounced feeling of inferiority; one of that kind had ceased to attend because she felt the doctor must be bored with her. Absenteeism was a common form of resistance. The delinquent's life was often so hard that he responded readily to the doctor's attitude.

Dr. J. R. REES thought that inexperience on the part of the psychotherapeutist was one cause of the patient's unwillingness to start treatment. Most patients became willing after a few attendances. The non-judicial and non-moral attitude of the doctor changed that of the patient surprisingly. The speaker had found that his opening gambit, a statement that he had no connexion with the court and was only interested in the individual, was often successful. He separated the delinquent's action from his self and asked the patient to coöperate with him in finding out why the symptom appeared. The homosexuals formed a group by themselves; they had usually read books on the subject which left them hopeless; treatment was consequently best directed to the other symptoms, which were always present. He thought the results of treatment of those serving sentences disappointing but he was encouraged by the numbers coming for treatment of their own accord before getting into the hands of the police; they were very willing patients. He thought it very important that every case should be seen between their hearing and the passing of sentence; coöperation was then much easier and the doctor could give a much more hopeful prognosis to the court.

Dr. GLOVER said that special methods of approach might be necessary in dealing with delinquents but the methods of treatment themselves were not new except in the way they were combined.

Dr. PRYNS HOPKINS agreed with Dr. Rees that the time at which a delinquent was brought for treatment was extremely important. He mentioned some observations of electrogalvanic response in genuine murderers in Moscow. These had shown that the greatest emotions were aroused immediately after arrest; apparently at that stage conflict was aroused partly by apprehension for the future and partly by the conflict between the super-ego and the action. After trial, judgment, and serving term the conflicts were quieted down. This work was of importance in showing when would be the best time to treat delinquents.

Dr. H. G. BAYNES said that nearly everyone who had committed an anti-social act expected punishment. He thought direct transference was necessary in treatment and that transference achieved in a roundabout fashion was on the wrong basis.

Dr. E. A. BENNET thought the objective method of approach was often best as some patients preferred not to be fully understood at first. In America automatic writing and drawing had been used for patients that were unapproachable. He had found that automatic writing could be produced by quite simple devices and was a successful initial method more especially for schizophrenic patients.

Dr. J. D. W. PEARCE said that most of his juvenile court cases had been seen before judgment had been given and he would be interested to find out if such children responded better than the rest to treatment.

Dr. W. R. BION considered that collusion with the relatives put the analyst in an awkward position which forced him to take up a false attitude.

Dr. PATERSON BROWN had found that in child guidance clinics the analyst had to reach the layer of depression and then he could turn an unwilling into a willing patient.

Dr. JOHN RICKMAN thought it important that the patient should be assured that he would be given treatment after discharge from prison.

Dr. GLOVER suggested that the investigation of empirical methods was of importance in a new science.

REPLY

Dr. HUBERT agreed with Dr. Rickman that the continuation of treatment after discharge from prison was essential. That time was particularly difficult for the patient.—Dr. CARROLL expressed disappointment that his provocative points had not been challenged. He agreed with other speakers that treatment should continue under the same physician after the patient's discharge from prison.

MANCHESTER MEDICAL SOCIETY

AT a meeting of this society on Dec. 2nd, 1936, Dr. R. E. LANE opened a discussion on

Industrial Diseases

limiting his survey to industrial poisons. There was, he said, a great difference between the toxicity of a substance per se and the extent to which it constituted a health hazard in industry. Toxicity was dependent on chemical nature, the danger to health on the physical properties of the compounds handled. The ease of absorption was a vital point. In the motor-body building industry lead poisoning arose as a result of the inhalation of fine particles of metallic lead. An attack of metal fume fever was brought on only by the inhalation of metal fume in a very fine state of subdivision and dispersion. If the same fume were allowed to stand for a short time before inhalation fever no longer occurred, because a clumping of the particles had taken place; the chemical nature of the fume had not altered. The clinical picture of industrial poisoning was often not what would be expected after reference to standard works on toxicology. Arsenic was cited as an example. Dr. Lane went on to illustrate from the lead trades the type of prophylactic measures to be adopted in any dangerous trade; the collaboration between medical and other technical experts; the doctor's preparedness with accurate knowledge when consulted by the employer.

Dr. W. M. GOLDBLATT referred to the prevalent lack of knowledge of the effects of industrial products on the worker. Often attention was only drawn to the dangers after calamities had occurred. Systematic research was needed in industrial medicine. At any moment a worker might present some obscure and unsuspected idiosyncrasy when the known facts about a product had led to a belief in its harmlessness. Criteria should be worked out for the detection of susceptible subjects, particularly to skin hazards, and such workers allocated to employment remote from exposure. A grave responsibility rested on the practitioner who diagnosed industrial disease. He should not conclude that a man was suffering from an industrial disease just because he presented a

symptom of a condition which might arise from his work. It was unwise for the dermatologist to conclude that a skin irritation was due to a dyed garment because on previous occasions he had come across cases attributed to this dye. The same name often referred to dyes of different composition. There were, however, difficulties in carrying out investigations which must not interfere with production on the one hand or on the other with the morale of workmen a little suspicious of medical service in industry. Routine blood, urine, and X ray examinations could only be made with careful organisation and administration.

Dr. J. M. DAVIDSON spoke of the importance of obtaining a full employment history and the significance of trifling symptoms. New risks arose from new uses of old poisons and new industrial processes, as in the risk from electric arc welding and manganese poisoning.

Mr. HARRI HEAP referred to the importance of accurate methods of chemical analysis which had thrown new light on lead poisoning. There was, he said, a close relationship between lead and calcium metabolism in the body and need for making sure of the normal occurrence in the body of various mineral elements.

REVIEWS AND NOTICES OF BOOKS

Paget's Disease of the Nipple

By KEITH INGLIS, M.D., Ch.M., Professor of Pathology in the University of Sydney. London: Humphrey Milford, Oxford University Press. 1936. Pp. 233. 36*s*.

THIS monograph is the product of a great deal of painstaking histological research, carried out with one eye on the clinical appearances of Paget's disease and the skin lesions which resemble it so closely. It is illustrated by numerous beautifully reproduced microphotographs; and since it contains a full bibliography, with brief but pertinent criticisms of many of the articles, the book can fairly claim to be the most complete treatise on Paget's disease which has so far appeared in English.

Detailed descriptions are given of 8 cases in which Paget's disease of the epidermis and ducts was present without scirrhous carcinoma in the breast; of a further 7 cases in which scirrhous carcinoma also was found infiltrating the connective tissue of the breast; and of a third group of 8 cases in which it was doubtful whether the cancerous process of Paget's disease had or had not given rise to scirrhous carcinoma of the breast. Prof. Inglis's work confirms the observations already made by Muir and Cheatle, and it leads him to conclude that in Paget's disease the epithelium lining the ducts is invaded by cancer cells which spread within it both outwards to the skin and downwards into the ducts from a primary focus close to the duct outlet.

Subsequent chapters describe cancerous infiltration of the nipple by cancer spreading from the breast, simple eczema of the nipple, cancer en cuirasse, and certain primary growths of the nipple, all of which have to be differentiated from Paget's disease. Several chapters are devoted to precancerous changes in squamous epithelium in many parts of the body, including extra-mammary Paget's disease, and the author describes how they may be distinguished from true Paget's disease of the nipple. Some of this section is not easy to follow, but the chief feature upon which the author lays stress is that whereas Paget's disease is characterised by invasion of healthy epithelium by cancer cells, in these other conditions the cells of the epithelium are themselves altered by degenerative, hyperplastic, and neoplastic disease.

Though there are slight differences between the views held by Inglis and those previously expressed by Muir, the essential fact upon which both are agreed is that Paget's disease of the nipple indicates widely spreading cancer in the ducts of the breast, which demands equally extensive treatment. No one, however, has yet stated clearly the exact relationship between the Paget cells in the ducts and the cells of the scirrhous carcinoma which forms eventually in the breast substance.

Williams' Obstetrics

Seventh edition. By HENRICUS J. STANDER, M.D., F.A.C.S., Professor of Obstetrics and Gynecology, Cornell University Medical College; Obstetrician and Gynecologist-in-Chief, New York Hospital; and Director of the Lying-in Hospital, New York City. London: D. Appleton-Century Co. Inc. 1936. Pp. 1269. 40*s*.

Whitridge Williams died in 1931, one year after he had revised the sixth edition of his text-book of obstetrics. The present issue has been completely revised, retaining as much as possible of Dr. Williams's text as is consistent with new developments in obstetrics, the general plan of the book remaining unchanged. Three new chapters have been added, one dealing with the hormones as related to pregnancy, another with urinary complications particularly pyelitis, and a third with analgesia and anæsthesia. The book is stated to embody the principles of obstetrics as carried out at the Johns Hopkins Hospital, and as such remains predominantly conservative in its teachings. The physiology of childbirth occupies more than a third of the book; this section is of great interest and abundantly illustrated.

As one of the most popular and widely read works on obstetrics in America it would be of interest to compare the principles enunciated in this book with current teaching in this country. Take the chapter dealing with the treatment of antepartum hæmorrhage. There are few who do not teach that the vaginal pack is virtually useless as a hæmostatic, particularly in the hands of the doctor faced with such an emergency, perhaps single-handed, in the patient's home. Yet English text-books lack the courage to condemn this treatment in print. In this book the "general practitioner is strongly warned against the employment of the vaginal pack." Or take the vexed question of the management of a case with a minor degree of disproportion—"We believe that the claims of the advocates of the induction of premature labor may be disposed of by a reductio ad absurdum—namely, that better fetal results could be obtained by allowing all patients in whom it appears indicated to go to full term and performing craniotomy whenever spontaneous labor does not occur." But it would be easy to give equally telling extracts from any chapter of the book, more especially perhaps that on amnesia, analgesia, and anæsthesia.

The work is well produced, paper and type are good, the illustrations are excellent and numerous, and as is usual in American text-books there is an extensive bibliography at the end of each chapter. Those who teach and practise obstetrics will find the matter and advice contained in this volume eminently practical and sound, and students may be assured that there is little which would not be accepted at obstetric examinations in this country.

Food and the Principles of Dietetics

Eighth edition. By ROBERT HUTCHISON, M.D., LL.D., F.R.C.P., Consulting Physician to the London Hospital and to the Hospital for Sick Children, Great Ormond-street; and V. H. MOTTRAM, M.A., Professor of Physiology at King's College of Household and Social Science, University of London. London: Edward Arnold and Co. 1936. Pp. 634. 21*s*.

THIS new edition, the preface states, has been necessary after a lapse of only three years because of the pace now set by research in nutrition. For the most part indeed the alterations and additions are made on account of recent research. Chemical formulæ now take their place in the descriptions of vitamins B_1 and C and the separate factors of vitamin B_2 are mentioned. Dr. Corry Mann's experiment which proved the great advantage of giving extra milk to school boys is described and McCance and Shipp's analyses have caused profound modification of the chapters on fish and meat. The account of the changes induced by cooking no longer speaks of pellicle formation. It must be a matter of regret to the authors that the analiyses of frut, vegetable, and nuts by McCance, Widdowson, and Shackleton were published too late to be utilised in this edition. The book has also been revised in other respects; a charming and characteristic chapter on the history of dietetics has been inserted at the beginning, from which one gathers that Hippocrates's remarks on digestibility were as penetrating as any recorded before the coming of chemistry in the nineteenth century. Diets are suggested for expectant and lactating mothers and for those in training for athletics. The basal requirements in calories, computed by the B.M.A., the Ministry of Health, and the League's technical committee, are set out.

Originally based on lectures given to students at the London Hospital in 1900, and in spite of all the growth and change it has suffered in the intervening period, this book still retains the simple wording and freshness of interest of a great teacher. It covers a very wide field, starting with an account of the constituents of food and their energy equivalents, going on to consider food requirements in various circumstances, and then giving a detailed account of almost every conceivable article of food and drink. The origin, structure, nutritive value, digestibility, cost, methods of cooking, and uses in dietetics are gone into for nearly every item. While the book is suitable for any layman who wishes to learn about food and for dietitians, it was presumably written primarily for doctors. They might like still more information, for instance, about the relation of vitamin D to the male sex hormone and œstrin, about the use of high carbohydrate diets in diabetes, and about canning.

Many groups of readers will be grateful to the authors for presenting so much useful information in such an acceptable manner. The book is full of common sense and understanding, and in spite of the necessary amount of detail it is easy to read.

Employment and the Depressed Areas

By H. POWYS GREENWOOD. London: George Routledge and Sons Ltd. 1936. Pp. 167. 3*s*. 6*d*.

MEDICAL men and women are citizens and the subject discussed here is of urgent importance to all concerned for the welfare of their country. The economic body of the country is grievously sick in some of its members, the sickness has persisted unduly long, and it might almost seem that the prospect of the special areas is one of lingering death. Mr. Greenwood's interest has been stirred primarily by a visit to West Cumberland, the least known and realised of the special areas. He might well be downcast after seeing Arlecdon; but he refuses to regard the position there or elsewhere as hopeless. And with refreshing optimism he writes of "areas of opportunity" and entitles his book "Employment."

There are early chapters on the history of unemployment, on economic and political theory, and on the totalitarian states, which provide interesting reading. These lead to the main thesis which develops not only the necessity but also the feasibility of attracting new industries into the areas. Everyone recognises that the old-established industries will never recover their former prosperity. The social services which have been introduced are admirably served by devoted workers, but these are palliatives, salves to a wound, means of easing the pain of unemployment. There must be new remedies and a break with tradition if recovery is to take place. Mr. Greenwood is convinced that this break lies in the redirection of industry by inducements to settle in the areas and the recognition by industrialists that there is a profitable field of opportunity. This thesis gains support from the views expressed by the late Commissioner for the Special Areas in a report which is reviewed on another page. Mr. Malcolm Stewart recommends the control of further expansion of industry in Greater London and the offer by the State of inducements to attract industries to the special areas.

A Handbook of Hygiene for Students and Teachers

By CYRIL G. EASTWOOD, B.Sc., M.B., M.R.C.S., L.R.C.P., D.P.H., Assistant M.O.H., Borough of Worthing; formerly Lecturer in Hygiene and Physiology to the University of Leeds. London: Edward Arnold and Co. 1936. Pp. 358. 6*s*.

THIS little book, simple in diction and illustration, really attains the high aim of teaching health, for it is free from banality and pedantry. Some manuals give the impression that the author is talking down to the reader; but Dr. Eastwood speaks to and not at his readers, instilling confidence, which is the beginning of understanding. The book includes no more than every person should know of the working of his own body and of hygiene, except perhaps some aspects of school medicine with which teachers should be familiar, but which need not be taught specifically to their scholars. Dr. Eastwood does not avoid technical words, but he seldom uses them where he can replace them by words in the common vocabulary. The few references to pathological conditions are introduced without mystery or alarm and mainly as natural sequences to the neglect of hygiene.

Did we not know it from other sources, this book would tell us that Dr. Eastwood is an experienced

teacher of physiology to the uninitiated; for he answers in anticipation the questions the novice is likely to ask, and as he goes along he is careful to make sure that all is really understood. He has produced an excellent book, of which we hope the circulation will accord with its merit. When a new edition is called for, we would ask the author to reconsider "a naturally insensitive bowel" as one of the causes of constipation. The chapter on reproduction might be enlarged, for its shortness suggests that the subject is being got out of the way. In the chapter on foods the weights perhaps should be given in ounces as well as in grammes, and some indication added of the requirements of the body in terms of pounds and ounces of purchased foodstuffs.

British Journal of Children's Diseases

IN the October–December issue (vol. xxxiii.) Dr. J. S. Cookson contributes a paper on the Erythrocyte Sedimentation-rate in Scarlet Fever and its Complications based on the study of 76 cases in various stages of the disease. His conclusions are as follows: (1) The sedimentation-rate (E.S.R.) is a simple and sensitive method of determining the progress of the disease. (2) A considerably raised E.S.R. on the fourteenth day of disease means that complications either have developed or will develop. (3) The E.S.R. is useful in differentiating the type of albuminuria, a high rate indicating acute nephritis. (4) With the exception of benign albuminuria and serum reactions the complications of scarlet fever produce a rise of E.S.R. before they cause signs and symptoms and during the presence of the complications. (5) There is no definite relationship between the E.S.R. and the other blood changes. (6) The E.S.R. is a useful index of the efficacy of treatment. (7) It is altered by a change in plasma-protein causing increased aggregation of red cells by alteration of the viscosity and indirectly related electric burdens.—In an article on Streptococcal Peritonitis complicating Scarlet Fever Dr. David Erskine, who records a personal case, states that peritonitis is a rare complication which may occur early, as in Rabinovitz's cases which were probably examples of a primary blood-borne infection of the peritoneum, or later when the peritonitis is probably due to inflammation of the mesenteric glands. Erskine's case was that of a male infant aged 18 months, who developed peritonitis on the twenty-first day of a moderate attack of scarlet fever. Laparotomy was performed the next day, when a large quantity of clear fluid without localisation or adhesions was found in the peritoneal cavity. Cultures of the fluid showed a pure growth of hæmolytic streptococci. Death took place 10 hours after the operation. The autopsy showed a fairly large indurated mass in the ileocæcal region containing several enlarged mesenteric glands, one of which had suppurated.—Dr. L. Helen Macfarlane records a case of Cancrum Oris following Measles. The patient was a boy aged 3, in whom the complication developed on the eleventh day of a mild attack of measles. Examination of the blood showed numerous white cells with 78 per cent. polymorphonuclears, so that the condition was not one of agranulocytosis. Treatment by injections of antiscarlatinal serum, diphtheria antitoxin, and sulphostab was unsuccessful, and he died 5 days after the onset of cancrum oris. Smears from the necrotic area in the mouth showed mixed Gram-positive and negative organisms but no spirilla. The case was of special interest in that, unlike most victims of cancrum oris, the patient was a healthy, well-grown child until he contracted measles which appeared to be mild and uncomplicated by broncho-pneumonia or enteritis.—In an article on the Treatment of Children by Artificial Light Dr. Eva Morton states that she has obtained excellent results by ultra-violet ray radiation in cases of anæmia and debility, bronchitis and catarrhal conditions generally, and skin diseases of various kinds.—The abstracts from current literature are devoted to urogenital diseases.

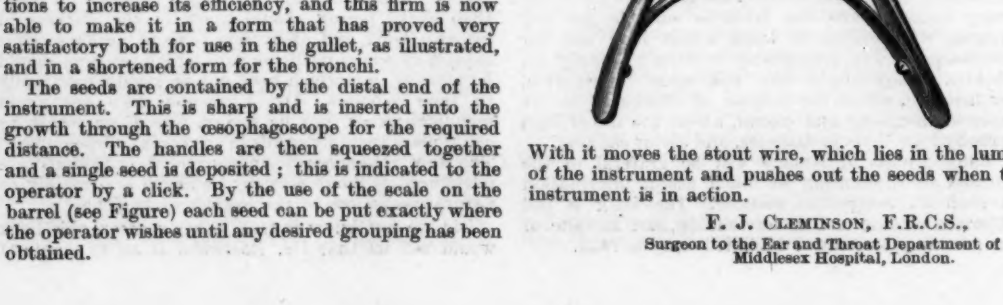
NEW INVENTIONS

A NEW RADON-SEED INTRODUCER

IN carrying out palliative treatment of carcinoma of the gullet by implantation of radon seeds I have never found an entirely satisfactory instrument. It seemed desirable to have something which, by an audible click, would indicate the deposition of each seed. So, with the help of Mr. D. W. Ashcroft, drawings were made of an instrument suited to this end, and were submitted to Mr. P. G. Phelps, of Messrs. Mayer and Phelps (59, New Cavendish-street, London, W.1). He suggested various alterations to increase its efficiency, and this firm is now able to make it in a form that has proved very satisfactory both for use in the gullet, as illustrated, and in a shortened form for the bronchi.

The seeds are contained by the distal end of the instrument. This is sharp and is inserted into the growth through the œsophagoscope for the required distance. The handles are then squeezed together and a single seed is deposited; this is indicated to the operator by a click. By the use of the scale on the barrel (see Figure) each seed can be put exactly where the operator wishes until any desired grouping has been obtained.

The instrument when fully charged contains ten "short Muir" seeds, each 7 mm. long. The method of loading is very simple and in brief depends on the turning of the ratchet "A" through a half circle by the lever "B" (see Figure). This disengages the ratchet and allows it to be drawn backward.



With it moves the stout wire, which lies in the lumen of the instrument and pushes out the seeds when the instrument is in action.

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THE LANCET

LONDON: SATURDAY, JANUARY 2, 1937

MATHEMATICS AND MEDICINE

STATISTICS are curious things. They afford one of the few examples in which the use, or abuse, of mathematical methods tends to induce a strong emotional reaction in non-mathematical minds. This is because statisticians apply, to problems in which we are interested, a technique which we do not understand. It is exasperating, when we have studied a problem by methods that we have spent laborious years in mastering, to find our conclusions questioned, and perhaps refuted, by someone who could not have made the observations himself. It requires more equanimity than most of us possess to acknowledge that the fault is in ourselves. A colleague of a famous contemporary statesman has been quoted as complaining that he used figures as though they were adjectives. The medical profession as a whole would not find it easy to counter a similar charge. For most of us figures impinge on an educational blind spot. We have never been taught to recognise them for what they are. This is a misfortune, because simple statistical methods concern us far more closely than many of the things that we are forced to learn in the six long years of the medical curriculum. Many of our problems *are* statistical; and there is no other way of dealing with them. In preventive medicine this is so obvious that it has acquired general recognition. In laboratory work, though recognition has come more slowly, it is now widely realised that it is very unsafe to base conclusions on statistically inadequate data. In clinical medicine recognition is coming more slowly still; so slowly that many avoidable errors, and a sad waste of material, still hinder progress.

The kind of problem that demands statistical treatment is familiar to all of us. What is the therapeutic value of antipneumococcal or of antistreptococcal serum? What is the expectation of life of patients who are operated on for carcinoma at various sites and in various stages of development? What are the relative merits of artificial pneumothorax or thoracoplasty in the treatment of phthisis? In all such problems, and they could be multiplied ad nauseam, the unknown, or uncontrollable, variables are so many that no sound conclusion can be based on the observation of a few cases, or on the uncritical assessment of many. Clinical science, like any other, is essentially experimental. We do things to our patients and we see what happens. It has become a truism that the history of a science is the history of its technique; and the technique of seeing what happens when we attempt to control disease is as yet very poorly developed. Because it is poorly developed we still do many things that we ought not to do, and leave undone much that ought to be done. The omission from the medical curriculum of a short course in statistical methods has led to an unfortunate misconception of the real difficulty that we have to face. It is sometimes supposed, by those who have conquered their repugnance to statisticians and all their works, that our technical problem can be solved by passing over our figures to a mathematical expert, and letting him do his best, or worst, with them. That way there is no real salvation. The mathematical statistician is trained to deal with numerical observations as such. He can expose statistical fallacies; and, by inquiry, he can often get behind the face value of the figures and allow for factors that are not immediately obvious from the tabulated findings. But his ignorance of medicine makes it as difficult for him to appreciate all the possible sources of error as it is for the medical man who knows no statistics to assess the real significance of his figures. Much can, of course, be done by the method of liaison, especially when it is close and understanding; but, to be fruitful, it demands some knowledge of statistical methods on the one hand, and some experience of medical problems on the other. In the form in which it is too commonly practised it has another fatal disadvantage. The statistician who is presented with a mass of figures from a long and laborious inquiry has not infrequently to report that they are of little or no value because they have been wrongly collected. The time to allow for statistical factors is when an inquiry is being planned, not when it is completed.

In this issue we commence the publication of a series of articles by Mr. A. BRADFORD HILL, D.Sc., of the London School of Hygiene, which will, we hope, be of service to those who desire to gain an insight into the application of simple statistical methods to problems of the kind that face them in their daily work. In his earlier articles Dr. HILL sets out, in simple terms and with a minimum of mathematics, the various methods that the statistician employs in assessing the significance of numerical results, illustrating each method by examples which will be of interest to the medical practitioner, or medical officer of health. In his later articles he considers a number of common fallacies, and difficulties of interpretation, that arise in dealing with data of this kind. We believe that this clear exposition, by a statistician who has had a wide experience of the problems with which medical men have to deal, and of the difficulties which post-graduate medical students encounter in grasping statistical principles, will be welcomed by many of our readers.

ORAL SEPSIS

WHEN OKELL and ELLIOTT[1] showed that a patient with pyorrhœa usually has organisms in his blood after tooth extractions—and sometimes even in the absence of any deliberate trauma—it was obvious that their findings might alter the outlook on oral sepsis. If it was easy for living

[1] Okell, C. C., and Elliott, S. D. (1935) *Lancet*, **2**, 869.

organisms to reach the circulation from septic gums the time had come to think again about the importance of "closed" as contrasted with "open" sepsis. It is not surprising therefore to find FISH and MACLEAN [2] bringing forward observations and opinions which if correct will modify not only medical notions but also dental practice. In the first place they confirm OKELL and ELLIOTT'S findings, and underline them by quoting the unpublished discovery by ROUND, KIRKPATRICK, and HAILS that bacteræmia may be produced in pyorrhœa patients by simply allowing them to chew hard sweets. From this they pass on to consider the working assumption that bacteria may live and multiply in the apices of living teeth, and that the absorption of these or their "toxins" may lead to local bony changes in the jaws and to diseases in remote parts of the body.

Various careful observers have been able to grow streptococci from the pulp and apices of living teeth that have been extracted with special precautions against contamination from the gums; but it is questionable whether any hitherto available technique for this purpose has been really satisfactory. FISH and MACLEAN challenge both the technique and the positive findings. Setting on one side the well-recognised pyogenic inflammations of the pulp and apices of dead teeth, they devote their attention to the common kind of case in which the teeth are alive but the maxillæ show bony modifications or other signs attributed to toxic absorption. Their conclusions may be summarised as follows: (1) At the apex of a tooth with living pulp there is never any histological sign of the round-celled infiltration that is the characteristic reaction of tissue to live streptococci, whereas when the pulp is dead, and streptococci are living in the necrotic material of the root canals, an intense round-celled infiltration is always to be found. (2) All specimens of gum margin examined, even those from very young children, have shown some signs of round-celled infiltration. It is well known that streptococci can nearly always be isolated with ease from the gums at all ages. (3) When teeth are extracted the organisms of the gums are pumped into the pulp by the rocking movements of the forceps, and that is why they can be found in sections of the extracted teeth (for the most part in the perivascular lymphatics). The same mechanism is held to account for the transient bacteræmia observed by OKELL and ELLIOTT, the organisms being pumped directly into the small blood-vessels. (4) With an appropriate technique, whereby the gum margins and pockets are partly sterilised and occluded by cautery, it is possible to extract teeth with living pulps from patients with pyorrhœa without contaminating either apex or pulp. The apices and pulps of such teeth, it is stated, were always sterile, whereas in controls where the gums were not cauterised they were always infected.

These interesting observations are rather unnecessarily overlaid with arguments a priori. Not every pathologist will feel so certain as FISH and MACLEAN that the active infection of living tissues with *viridans* streptococci must inevitably be accompanied by a round-celled reaction, or that streptococci must have a nidus of necrotic tissue if they are to maintain themselves for any time in the body. The "quiet periods" of relapsing staphylococcal osteomyelitis, for example, suggest other possibilities. But the clinical and pathological implications of the new work on oral sepsis are far-reaching. Among them is the implication that the absorbing alveolar crests between pyorrhœic teeth, which are generally referred to as radiographically "infected," are in reality not infected at all; so that there is no reason why every mechanically useful live tooth should not be saved. The authors also say that the bacteræmia of extraction can be avoided as far as live teeth are concerned if the gums are prepared by preliminary cauterisation; and it is to be hoped that this statement, for which no direct evidence is produced, will be confirmed by actual experiment on an adequate scale. It is by no means apparent what effect the bacteræmia described by OKELL and ELLIOTT is likely to have upon the general health of otherwise normal persons, but there is one risk at least that might be eliminated by its prevention—namely, the determination of infective endocarditis in those with diseased or defective heart valves. And whatever the final verdict on these new observations, it is certainly a healthy sign that oral sepsis has come under serious experimental review.

[2] Fish, E. W., and Maclean, J. (1936) *Brit. dent. J.* **61**, 336.

FLUID AFTER OPERATION

WATER has often been the therapeutic fashion. To-day, after a period when dehydration was hailed as the sovereign remedy, water is once more in the ascendant—or so it seems from a letter to an American contemporary which draws a touching picture of the earnest school-mistress striving with daily drinking drills to make her charges water-conscious. In treatment the misuse of water is usually due to confusion of empiricism and reason. Fluid is useful in febrile perspiring patients, for instance; but the idea that it washes away bacterial toxins is ungrounded, and to try to flush out hypothetical and probably non-existent toxins from an eclamptic woman already sodden with unwanted fluid is neither logical nor desirable.

In many states of dehydration the need for water, or rather fluid, is obvious enough, and the patient in full possession of his faculties is not likely to suffer in silence. It is when he is no longer able to complain of thirst—or is forbidden to quench it—that the lack becomes a serious danger. This danger is fully recognised in the treatment of many conditions, such as diabetic coma; but we doubt whether the frequency and severity of postoperative dehydration is as widely realised as it should be. Many factors combine to deplete the fluid reserves of the patient who undergoes a major operation: preoperative starvation, hot operating theatres, excessive swaddling

in blankets, loss of blood, and postoperative vomiting may all take part; and finally shock causes internal dislocations of fluid balance. Elsewhere in our present issue Dr. WALTHER reports some observations that illustrate both the gravity of surgical dehydration and the readiness with which it responds to treatment. His data suggest that where the oral route is impassable saline is better given by rectum than intravenously, and he surmises that fluid entering the circulation by way of the intestine may pick up protein in the liver and so become less liable to leak out of the vascular channel.

The present popularity of intravenous saline infusions gives these observations practical importance. Not many years ago the surgeon would marshal an array of scalpels, ligatures, coils of rubber tubing, and bottles of cocaine, and would proceed to dissect out a vein, tie in a cannula, and squirt in saline with an inadequate rubber-pistoned syringe. Small wonder that the operation was reserved as a last desperate attempt to revive the moribund. Nowadays the technique is so simple that there may be a real danger of causing harmful waterlogging of the lungs by over-enthusiastic use of saline. There are, of course, many surgical occasions when fluid cannot be given by mouth and a few when rectal administration is also impossible. It is in these circumstances that Dr. WALTHER regards plasma transfusion as the ideal. But when fluid can be given by the alimentary tract it is clearly desirable to introduce it in this way, which (unlike intravenous injection) at least allows the body to regulate the rate of absorption and to reject excess if necessary. If further experience confirms Dr. WALTHER'S conclusions they should prevent us from forgetting that the patient has a mouth and an alimentary tract designed for the absorption of fluid.

CONTROL OF VENEREAL DISEASES

WHETHER through ignorance or lack of interest, the general public is usually apathetic to the control of venereal disease, and this attitude is reflected in the tardiness with which public policy adapts itself to meet the changing needs of the problem. In the United States, where the incidence of venereal disease is high, the vigorous propaganda instituted by a zealous public health service has in recent years caused some stirring of the public conscience. In 1935 the mayor of New York City appointed a commission representative of New York (City and State) to study the methods of control adopted in the Scandinavian countries and in Great Britain, where it was thought that some measure of success had been achieved. The report[1] of this commission, which is now available, includes a review and appraisal of the administrative measures adopted in this country for the prevention, diagnosis, and treatment of venereal disease, and a critical comparison of these methods with those adopted in the Scandinavian countries in the light of brief observation and available statistics.

[1] *Amer. J. Syph.* July, 1936, Part 2.

It seems that in Denmark, Norway, and Sweden, as in some of the British Dominions, venereal diseases are notifiable by law and treatment is compulsory. If persuasive methods fail, the health authorities have power to enforce submission to medical care, including admission to hospital if this is considered necessary—a precaution which is commonly employed in the early infectious stages. Penalties may be inflicted on those who knowingly transmit infections and power is given to trace contacts and known sources of infection. Coercive measures may be adopted for the non-coöperative or defaulting patient. The Scandinavian peoples are well accustomed to the discipline of social control so that it is possible to enforce these regulations without serious difficulty. Frequent use of in-patient facilities is necessary because the populations are scattered and the facilities of treatment are often inaccessible. In highly industrialised Britain, where the population is largely grouped in relatively small areas and traditionally resentful of interference with personal liberty, central facilities for treatment are readily accessible and regulation for compulsory treatment would be difficult to enforce. In other respects the measures adopted in these countries are similar to our own and include free diagnosis and treatment for all regardless of economic status. In comparing the results attributable to these schemes the commission finds that there has been no decline in the incidence of gonorrhœa in any of the countries and that in Great Britain it has possibly increased in prevalence. On the other hand the figures indicate a general diminution in early syphilis, the reported cases in 1933 showing an incidence of 7 per 100,000 in Sweden, 20 in Denmark, and 30 in Oslo, the chief city of Norway. The commission formed the opinion that in Sweden and Denmark, at all events, the reporting of cases was faithfully carried out by medical practitioners and that these figures fairly represent actual prevalence. For this country the figures are less impressive; in 1933 the number of new cases of syphilis applying to treatment centres amounted to 21,525, an incidence of 56 per 100,000 in a population of 38,000,000. Clearly this figure is not the total incidence, because no account is taken of patients treated elsewhere than at treatment centres. In its report the commission makes the guarded suggestion that lack of legal power for the enforcement of treatment in this country may be partly responsible for the disparity; while recognising that this absence of legislation is due to the peculiar nature of the local circumstances, it points out that a strong minority opinion in this country favours the introduction of laws to make venereal diseases notifiable and treatment compulsory.

From the evidence collected by this commission and that available from other sources it seems to be established that the incidence of syphilis has declined in this country, but it will be agreed that the rapidity of the decrease is hardly commensurate with the ease with which patients may be rendered non-infectious by modern methods of treatment. The success achieved compares unfavourably with

that in countries where social control is more vigorous and the question may be asked how far the arguments against compulsory notification and penalisation of the delinquent are still valid. There are nowadays so many incursions into the personal liberty of the subject that it is by no means certain that the provision of limited powers to coerce the infectious defaulter or the neglectful parent would cause resentment. A clue to the popular feeling on this point was provided a short time ago. In 1934 a questionnaire [2] was submitted to patients attending the Salford municipal clinic for the treatment of venereal diseases, inviting expressions of opinion on two points: (1) Should a person suffering from a venereal disease be compelled to receive treatment, provided it is given confidentially and free? (2) Should the parents or guardians of children suffering from venereal disease be compelled to have such children treated under the same conditions? In reply to both questions there were 429 ayes and 5 noes. The opinion among this group of infected people was thus overwhelmingly in favour of some form of compulsion.

Nevertheless, in considering the coercion of non-coöperative or defaulting patients we must not risk losing all that has been gained by the persuasive approach. The risk is that minatory regulations will drive the disease underground, and this risk is far greater in England than, for example, in the Soviet Union where venereal diseases are regarded as diseases like other diseases and nobody thinks the worse of a man because he contracts them. The conditions are really not comparable. But in England and Russia alike the object must be to make the patient realise how much he stands to gain by cure, and a useful illustration of this comes from the social service department of the University of Pennsylvania,[3] where there has been complete freedom to experiment in what Louise Ingraham calls "technics of persuasion." Here as in many other places the aim has been to obtain from the syphilis patient his voluntary disclosure of recent sexual intimates and his services in personally recruiting them for medical examination. On this basis persuasion was 92 per cent. effective when the individual contact could be personally reached, and this success was independent of the type of community, whether black or white, well-to-do or indigent. Of 201 patients with syphilis it appears that 114 of them identified 174 exposures, being an identification-rate of 1·5 contacts per productive case. Possibly, the author admits, a more aggressive technique would give greater immediate reward, but at the same time it would almost certainly sacrifice future gains. Father O'Flynn, who had a way with him, did however sometimes coax the lazy ones on with a stick.

[2] City of Salford V.D. Scheme. Annual Report, 1934, p. 14.

[3] *J. Amer. med. Ass.* Dec. 12th, 1936, p. 1990.

ANNOTATIONS

GREAT ALTITUDE

AT a time when the sport of mountain-climbing is attracting every summer a larger crowd of devotees, especially in England and Germany, any sound research into the medical aspects of great altitude must have a practical interest. A more serious importance comes from the growing conviction that aeroplanes are likely to fly at increasingly greater heights, and the recognition of anoxæmia as a factor in pulmonary and circulatory disturbances.

On the firm foundations built at Oxford by Haldane, Douglas, Priestley, and their co-workers, there is arising a superstructure, much of the work on which has been done in America. It is possible that there is lacking in the United States the coördinating influence of Barcroft over the Cambridge school. But the Americans are fortunate in having high mountains near at hand, a circumstance which has given to much of their work a very practical bent. Somervell, Raymond Greene, and others in this country have written of the digestive disturbances and failure of appetite accompanying the many efforts which have been made to climb Everest. Recently, working in a steel chamber, Van Liere [1] has shown that at only 14,000 feet there is an average prolongation of the emptying-time of the stomach of 35 per cent., the least susceptible subject showing a prolongation of 13·2 per cent. The delay is caused by a loss of motility, which may be due to the increased output of adrenaline during anoxæmia. It will be recalled that medical officers of various Everest expeditions have laid stress upon loss of appetite as a possible factor in the degeneration noted after prolonged residence above 20,000 feet, but it has generally been held that its influence was not the paramount cause. From this point of view, the new work of Talbott and Dill,[2] of Harvard, is of importance. They describe a disease, first reported by Monge, and named after him, which develops after residence over many years at such altitudes as 15,000 feet. It seems probable that though Monge did not observe it in anybody who had lived in the highlands for less than two years, it might appear much sooner at a greater altitude. Talbott and Dill give as its symptoms headache, hoarseness, loss of appetite, weakness, paræsthesiæ, and transient spells of stupor; and, as its signs, cyanosis, pigmentation, generalised vasodilatation, and hypotension. Some, though not all, of these signs and symptoms have been observed in climbers suffering from altitude deterioration. The exact ætiology of the disease is unknown, and in discussing it Talbott and Dill pay, perhaps, too little attention to the work of Argyll Campbell.

The time seems ripe for trying to elucidate this and many kindred problems of growing importance. Everest was almost climbed in 1933. In 1936, through no fault of the climbers, the expedition was a fiasco. A repetition of this fiasco, due to weather conditions, can never be excluded. Yet if the last expedition had included a scientific programme it would have produced some solid return for the many thousands of pounds expended. It is not enough that the medical officer should pursue a line of

[1] Van Liere, E. J. (1936) *Arch. intern. Med.* **58**, 130.

[2] Talbott, J. H., and Dill, D. B. (1936) *Amer. J. med. Sci.* **192**, 626.

research of his own: he is usually one of the climbers; he has a gigantic responsibility for the health of the party which must absorb most of his mental energy; and he may even himself be suffering from the clinical abnormalities which he is attempting to describe. If the necessary separate fund can be raised, the next Everest expedition should take in its train an independently financed scientific group. This should include not only physiologists but clinicians, as capable as the medical officers of past expeditions of observing the reactions of their companions to the abnormal environment, but, like Lord Nuffield's professors, freed from the responsibilities of practice.

VARIATION IN ANIMAL VIRUSES

VARIATION in filtrable viruses has been known nearly as long as the viruses themselves. Almost before the conception of filter-passing viruses had taken shape, and certainly before it was generally recognised, Pasteur demonstrated that a variant of the virus of rabies could be produced, and, as everyone knows, employed it in the prophylaxis of human infection. The adaptation of the virus of smallpox to growth in the tissues of the calf, resulting in the fixed variant vaccinia, also belongs to the early history of viruses. And since that time, especially in the last decade, many more examples of virus variants have been brought to light. Some of these have been discovered more or less by accident—for example, the necrotic variant of Shope's rabbit-fibroma virus—but most have been sought intentionally, often with specific prophylaxis in view.

In a long and well-documented paper the whole question of variation in animal viruses has lately been reviewed at length by Findlay.[1] Much of Findlay's work on viruses has been concerned with the production of variants and a study of their properties, so that he is peculiarly fitted to write such an article, and he has done it extremely well. Starting with an enumeration of all the available facts concerning virus variants, he briefly reviews our knowledge of variation in multicellular and unicellular organisms and finally considers the application of this to viruses. Naturally it is harder to study variation in viruses than in multicellular organisms or even unicellular organisms like protozoa, for viruses cannot be cultivated apart from living cells. As yet it has not been found possible to raise strains of virus from a single virus particle and there appears little likelihood of viruses possessing a demonstrable nuclear apparatus, thus making it impossible to distinguish between Lamarckian and genetic variation. Nevertheless, as Findlay points out, the available evidence suggests that there is no fundamental difference between variation in viruses on the one hand and in unicellular and multicellular organisms on the other. It is true that the absence of any demonstrable mechanism whereby hereditary characters are transmitted, such as exists in higher plants and animals, makes the application of the term mutation to some virus variants incorrect, and in order to overcome the difficulty it has been suggested from time to time that viruses are themselves genes; that they have arisen from higher forms and that as the result of highly specialised parasitism all structure and function, other than that associated with the hereditary characters, has been lost. This, however, is pure hypothesis with little to commend it, and it seems more reasonable to assume that in such primitive forms of life as viruses any such specialised medium for the transmission of heritable characters has not been developed. That viruses are living things is strongly supported by the fact that they exhibit this phenomenon of variation. Indeed, as Findlay says in his conclusions, it is hard to explain the facts except by regarding viruses as organised living entities. But interesting and important though this aspect of variation in viruses may be there is an eminently practical side to it. Virus variants have proved their value in the active immunisation against virus infections: in recent years we have seen them used with success in the prophylaxis of yellow fever and horse-sickness, and no doubt the near future will provide further examples. It is this side of the problem, quite apart from the academic one, which will ensure adequate attention being paid to this interesting question of variation in viruses.

[1] Findlay, G. M. (1936) *J. R. micr. Soc.* **56**, 213.

THE SAFETY OF PREMEDICATION

THE use of formidable accessory agents given before the anæsthetic proper is so frequent at the present time that it is important to know what, if any, disadvantages may accompany the many undoubted benefits which the practice confers on most patients. Dr. Dawkins in order to determine the answer to this question contrasts[1] two series of patients, the first operated on between 1921 and 1925 and the second between 1931 and 1935. Each series comprised more than three thousand operations, and altogether he has for his study analysed the histories of over 16,000 anæsthetics given at several London hospitals and in private practice. Conclusions drawn from a study of this dimension are worthy of serious notice, and perusal of this little work gives information with regard to almost every complication that has been associated with anæsthesia. The matter is well arranged and tabulated so that the author's findings are easily perceived. His final conclusion is that during the last five years definite progress has been made towards the reduction of anæsthetic complications. Injudicious use of basal narcosis however increases the risk of pulmonary troubles. Some of the figures in the many tables provide an interesting study. Generally speaking they agree with commonly held opinion both as regards mortality and morbidity. For example, the hope that spinal anæsthesia might save patients from lung trouble, not infrequent after inhalation, a hope long since dissipated, is here again shown to be without foundation. Pulmonary morbidity is shown by the author at 11·5 per cent. after spinal anæsthesia, and at 5·9 per cent. after ether. Chloroform shows the same pulmonary morbidity as ether, but the number of patients is so small that much value cannot be placed on this conclusion.

CATGUT SENSITIVITY

THERE are still many problems that await solution in the use of catgut as material for ligatures. Examination of a wound that has broken down occasionally reveals absorption of the catgut in a fraction of the time stated by the manufacturers. Local reaction to the presence of the catgut also occurs most unexpectedly in some presumably clean wounds, followed either by delayed healing or by disruption. Dr. C. J. Kraissl of New York has thrown light[2] on these problems by his investigations into defects in the structure of catgut and by his demonstration of the possibility of catgut

[1] On the Incidence of Anæsthetic Complications and their Relation to Basal Narcosis. By C. J. M. Dawkins, M.A., M.D., D.A. London: John Murray. 1936. Pp. 56. 3s. 6d.

[2] *Surg. Gynec. Obstet.* November, 1936, p. 561.

sensitivity. Using a carefully constructed apparatus he tested the absorption time of various specimens of catgut. Occasionally a strand of catgut was absorbed within a few hours instead of taking its usual time of several days. Examination of specimens of catgut revealed that fraying of the strands at the sites of bends occurred. In other samples comparatively large foreign bodies of some apparently amorphous material were found twisted into the gut. Such defects may obviously alter the rapidity of digestion in the tissues, and Kraissl considers that each strand as used should be examined. Packing of catgut in small glass tubes he regards as unsatisfactory. The dehydration of catgut which is necessary to render it boilable has two disadvantages. It leads to more ready absorption in the tissues, and it decreases the flexibility of the product. For these reasons Kraissl thinks we should be content with non-boilable gut, and with sterilisation of the gut in the glass tube by germicidal solutions. Chromicised gut is largely used. Intradermal tests have shown that some patients are sensitive to chromic acid and this may account for failure of healing in certain instances. Sensitivity to the protein of the catgut itself may be an even more important factor. Kraissl has actually sensitised guinea-pigs and subsequently obtained disruption of wounds sutured with catgut. He suggests that in the human subject a previous operation is sometimes the sensitising process. By cutaneous tests he found that allergic patients were quite often sensitive; in a series of patients tested the highest incidence of sensitivity was in a group who had presented disruption of wounds. He suggests that, if catgut is to be used in individuals who have a history of allergy, previous operations, or exposure to chromic acid, appropriate skin tests would be a useful safeguard.

A WORLD ENCYCLOPÆDIA

FROM the bacillus which turned animals blue to fighting aeroplanes Mr. H. G. Wells has foreseen so much which at the time seemed impossible that his latest proposal will be received with respect as well as interest. It is nothing less than a series of volumes in which the ordinary citizen would, without any great toil or difficulty, find in clear understandable language, and kept up to date, the ruling concepts of our social order, the outlines and main particulars in all fields of knowledge, an exact and reasonably detailed picture of our universe, a general history of the world, and references to the primary sources of knowledge.[1] With the reasons which have led him to suggest this enterprise and their validity everyone will be in sympathetic agreement. We live, he says, in a world of unused and misapplied knowledge and skill, and those who are mainly responsible for modern knowledge are often dismayed to find it so ineffective; those who direct the affairs of the world do it without having the relevant information and even without making use of what they do know. To cure or at any rate alleviate the trouble he says that we must bring together an account of what is known which shall be available to everybody. He is, rather unjustly, a little contemptuous of what has already been done in the way of encyclopædias: they are collections of disjecta membra without the coherence which is needed for adequate synthesis and the articles may be neither authoritative nor impartial. He wants statements which have been agreed to by representative experts under the guidance of an ad-hoc body which might be called the Encyclopædia Society that would be responsible for getting the necessary revisions made and published and indeed for persuading divergent opinions to come to some agreement. The substance of the book would, we gather, be as much quotation as fresh writing. It seems indeed that Mr. Wells contemplates the extension of his own "Outline of History" to all knowledge, but the only indication he gives of the scale is the remark that the ordinary citizen might have the encyclopædia in his own home.

For a common man it is difficult to take such a panoramic view as seems to come easily to Mr. Wells and most of us will naturally think of his proposal with reference to our own special subjects. Medicine is a comparatively narrow field, and it is cultivated with an interest and diligence which are possibly rather exceptional. But even here everyone will agree that synthesis would improve the situation; physicians, surgeons, gynæcologists, and the rest keep fairly well in touch with one another through hospitals, journals, meetings, and patients. But how do they maintain contact with biology, physics, physiology, and the other institutes of medicine? And when it comes to making medical knowledge effective in daily life we surely see many gaps and much delay, not the fault of the specialists who know but of those who have to try to guide the horrid tangle of social life. It seems as near certain as may be that diphtheria is preventable, yet 36 persons died of it last week: it seems clear that people would be better if they drank more milk, but the Milk Marketing Board has led to their drinking less, and so on. The rational external observer would probably be surprised that the annual report of the Registrar-General, which he might well surmise would be their bible, is not a best seller among medical men. But it is unnecessary to elaborate by instances an obvious truth of which the medical profession is well aware: they deplore the necessity of so many specialists and the rarity of the general physician who is so useful to patients and they do what is possible to extend the curriculum.

It is not however with the position within any group such as medical men that Mr. Wells is chiefly concerned; inside the profession synthesis and application are in fact not badly done or at least done better than they might be or used to be. But where is a doctor to turn if he wants to know about the causes of poverty, the economics of poultry farming, the nature of X rays, the technique of bread making, the history of roads, the influence of John Wesley, coal and how best to use it? He may well want to do so apart from any natural curiosity, for they are all capable of having paramedical bearings. The answer is that he will find most of what he wants in any decent encyclopædia and the rest in an efficient public library; there will likely be a small residuum which he will not find at all because the answer to his particular question is not known. It would naturally save him a little trouble if he could turn to his copy of the World Encyclopædia; but however complete that might be we doubt whether Mr. Wells's main object would be achieved by its provision. The difficulty is not that the information is not in print, but that people will not, or at any rate do not, read it, and his campaign, even if it is not delivered of the encyclopædia, will do good by stimulating a certain number to overcome their reluctance to know what they are about. But

[1] A Friday Evening Discourse to the Royal Institution, Nov. 20th, 1936: printed in *Nature* for Nov. 28th. The thesis of this discourse is taken from "The Anatomy of Frustration: a Modern Synthesis" (London: The Cresset Press) in which Mr. Wells pretends to have found the draft of such a World Encyclopædia and considers its merits.

he also has to meet the difficulties that most people, unlike himself, prefer details to generalisations, and that they greatly mistrust the agreed statements of specialists as bases of action, as indeed they have reason to do. Mr. Wells thinks that man is in danger and that unless he does something to pull his mind together his condition will be desperate. It may be so, but man has a wonderful capacity for getting out of queer situations and he generally prefers to go his own irrational way. The present is not as different from the past as many people think; as in so many difficulties a change of heart is wanted more than a change of technique, and a disinterested reincarnation of the Encyclopædia Britannica would go a long way to nourish it.

ARTIFICIAL PRODUCTION OF ERGOT

A PROCESS which has been invented and patented in the United States is not only of scientific interest but promises to be of commercial importance. For nearly two years past there has been a world shortage of ergot of rye, due in the 1935 season to the failure of crops in Spain, Portugal, and Russia, and in the 1936 season to the civil war in Spain where the larger part is produced. Not only have prices advanced to more than four times the normal figures but supplies have at times been so difficult to obtain in adequate quantities that makers of the active principles have found it difficult to keep pace with the demand. It is understood that the new substance is a result of the discovery that *Claviceps purpurea* in saprophytic culture develops the active principles which are present in extracts made from the natural sclerotia. Extracts from this artificially produced ergot have the physiological activities and therapeutic value of extracts made from the natural ergot of rye.

MEDICAL LIVERPOOL

"BRITAIN," says Trevelyan, "has always owed her fortunes to the sea, and to the havens and rivers that from the earliest times opened her inland rivers to what the sea might bring." To the little market town and coastal port of Liverpool, with a population of but 2000 in the seventeenth century, it brought the rich trade with the West Indies, the gains of smuggling with the Spanish colonies, and the almost fabulous wealth of the traffic in slaves, which the kindly merchants of the town delicately called "the African trade." By the middle of the eighteenth century the population had increased to 18,000, and soon Liverpool was to be the first slaving port of Europe; and in 1749 the newly built Royal Infirmary was officially opened by Edward, Earl of Derby. But history is not altogether the mechanical unfolding of economic processes, and it is good to be reminded that it is made by ordinary, day-to-day people. "A Medical History of Liverpool from the Earliest Times to the Year 1920" [1] touches general history at an interesting angle, even though it is primarily a detailed record of the activities of a town's medical men and nurses, and their lay associates. It is a lively book to read—as serious, as humdrum, as entertaining, and as varied as medical life always is. Men built hospitals, administered them, founded a medical school, drove in their carriages, practised their craft. There were wars, murders, famine, and pestilences. Quacks sold their nostrums, built rich houses, gave their names to streets. Body-snatchers were caught and sent to prison, and members of a learned society passed a resolution in favour of an alteration in the law so that bodies might properly be available for dissection. Throughout the story the tang of the sea blows in—Hugh Owen Thomas practises his orthopædic methods on countless dock labourers and ships' workers, and diseases peculiar to foreign lands touch the port so nearly that a school of tropical medicine is born.

One of the arguments originally put forward in support of the establishment of a medical school in the town was "so that the erroneous and popular opinion that there is a great want of clever medical men in Liverpool—so universal in London and current everywhere—will then be satisfactorily refuted. We shall then cease to be inundated with such shoals of Welshmen, Irishmen, and—last and worst of all—Scotchmen." The latter hope was not realised; and to-day all concede to Liverpool admiration for great accomplishment.

THE SPECIAL AREAS

THE third report of the Commissioner for the Special Areas (England and Wales) [1] is primarily concerned with economic reconstruction in the areas, but problems and measures affecting the health of the communities come up incidentally. Long-continued unemployment in an area may impair health directly or indirectly. The direct relation is all too obvious; two methods of indirect causation emerge from the report. In the first place while transference is accepted as inevitable and indeed desirable the fact is recognised that it tends to drain an area of much of its best stock: "The policy of transfer has a dual nature. It provides positive gain for the unemployed man who has the enterprise to start life afresh in a more prosperous district, but it has a negative reaction on the special areas through the loss of many of their best men and youths." In the second place financial stringency handicaps the work of the local authorities concerned: "The high rate burden and the constant anxiety of local authorities about the means of meeting increasing liabilities with a falling income are steadily undermining the standards of service provided." Merthyr Tydfil has a rate of 27*s.* in the £. An examination of the mortality figures was made for the Commissioner, and he states "I was much relieved to find that the statistics do not indicate an abnormal situation . . . it must be borne in mind," he adds, "that these statistics do not tell the whole tale. It would be fallacious to assume from them that there is no deterioration in the health of the average man who has suffered a fairly long period of unemployment. Personal observation leads me to the conclusion that there is some degree of deterioration of condition in most of such men." The financial difficulty of the local authorities in meeting any extension of social and sanitary services has been eased by grants up to 75 per cent. of the total cost. Such grants have been made towards mental hospitals, voluntary hospitals, child welfare centres, district nursing, open-air nurseries, physical training, cookery classes, a cheap milk scheme in the Rhondda district, improvements in water-supply, sewage disposal, and closet conversion. It has been possible, for example, to provide 27 additional district nurses for the Durham and Tyneside area and 63 in South Wales. This report throughout conveys a sense of the human tragedy involved: its most poignant paragraphs

[1] From data collected by T. H. Bickerton, partially prepared by Miss May McKisack and edited by H. R. Bickerton and R. M. B. MacKenna. London: John Murray. 1936. Pp. 313. 21*s.*

[1] H.M. Stationery Office, Cmd. 5303. 3*s.* 6*d.*

deal with unemployment among young persons (Part X). Its perusal will quicken the interest and sympathy of those already familiar with the special areas, and should stimulate others to an awareness of the position.

LONDON WATER

THE Metropolitan Water Board has many notable achievements to its credit. Not the least is the wisdom it has shown in selecting directors of water examination who can write. Houston always had something to say, and said it, and Lieut.-Colonel C. H. H. Harold is a worthy successor. In this respect and in the absence of acrimony and special pleading, the whole series of annual reports differs greatly from those of the three eminent chemists retained by the eight water companies whose undertakings were taken over thirty years ago. The task which the Board has set itself—to supply one standard of water only, coliform organisms absent in 100 ml.—is no easy one. That may be easy enough for undertakings drawing their raw water from upland sources well away from and for the most part above human habitations, but when the sources are rivers passing through large and populous towns, and wells in districts which are suburban rather than rural, it is only by unremitting watchfulness that such an aim can be reached.

The work of the Board's laboratories[1] is divided into three sections—bacteriological, biological (or planktonic), and chemical. In the bacteriological section an experiment into the possible multiplication of *B. coli aerogenes* and other organisms in cisterns and filter beds was conducted.

It was found that filtered Thames water, initially containing no coliform organisms in 100 ml. and giving an agar count of 30 colonies per ml., kept in a plugged and covered bottle, yielded a considerable increase of saprophytes in 24 hours, which gradually disappeared after 5 to 6 weeks, but no aerogenes. The same water inoculated with either aerogenes, communior, grünthal or communis (from 270 to 410 per ml.) yielded no aerogenes or communis in 2 weeks, and no communior or grünthal in 3 weeks. Treated with ozone and similarly inoculated, the aerogenes and grünthal disappeared in 2 and the others in 3 weeks. In these samples as in the control saprophytes appeared, and after a few weeks disappeared. When sterilised with chlorine so that no residual sterilant was present after 24 hours, saprophytes did not appear, and communior disappeared in 3 weeks, but aerogenes persisted for 10 weeks and grünthal and communis for 7 weeks. The same water boiled yielded no saprophytes, but aerogenes increased from 270 to 40,000 in 5 weeks and disappeared in 27 weeks, whilst the other organisms were not found after 5 or 6 weeks. The water again became negative to MacConkey in from 2 to 30 weeks, the best times being given by the ozonised group.

It would appear, Colonel Harold remarks, that the viability of coliform organisms is influenced largely by the presence and multiplication of saprophytic survivors, and the extent to which these prevail depends largely upon the efficacy of the initial process of disinfection employed, although there may be other contributory factors.

The biological section of the report is of great interest, and it appears that Colonel Harold intends to develop a branch of water examination which has been somewhat neglected in this country, although Houston and Mr. Wilfred Rushton, D.Sc., among others, have done useful work. Fresh-water plankton has been studied more intensively in the United States and Central Europe than in most other countries. Colonel Harold gives photographs of a plankton net and sampling bottle regularly used on a motor launch on the Queen Mary Reservoir. For reasons which are not clear, lakes and reservoirs are richer than rivers in both phyto- and zoo-plankton. The fact that there are few lakes of any size in this country and that these are relatively far from seats of learning may account for the slow development of ecological as distinguished from morphological studies of fresh-water plankton in Great Britain. The Freshwater Biological Association of the British Empire in February, 1932, opened a laboratory at Wray Castle on Windermere for the study of that lake. On the balance of these two classes depends the probability of trouble arising from unusual tastes and smells or from the blockage of filter-beds. The vegetable plankton develops from spores by photosynthesis, the carbon dioxide of bicarbonates supplying what carbon is required, whilst nitrogen and mineral constituents are obtained from nitrates and other salts dissolved in the water. As the algal flora develops pasturage becomes available for the animal population. Increase of both kinds of plankton can go on until the least plentiful plant foods are exhausted in the water; these seem to be silicates, phosphates, and oxidised nitrogen (nitrates and nitrites). The development of the phytoplankton is also dependent on the effective penetration of the water by sunlight; hence a rather complicated seasonal variation occurs.

The study of plankton seems already to be enabling its control by algicides, such as copper sulphate alone or combined with chloramine, to be put on a sounder basis, and should do much to remove the troubles to which Houston so often referred. The chemical section, too, is devoting attention to the determination of those minute amounts of constituents which are limiting factors in the growth of plankton.

[1] Metropolitan Water Board: thirtieth annual report. By Lieut.-Col. C. H. H. Harold, M.D., D.P.H., director of water examination. London: P. S. King and Son, Ltd. Pp. 101. 10*s*. 6*d*.

CAUSES OF STERILITY

AMERICAN medicine, with its capacity for organisation, has gone further than the rest of us in the treatment of the childless marriage, and a symposium appearing in the *Journal of the American Medical Association* for Dec. 5th is valuable as reflecting present opinion in the United States. The first contribution is by S. R. Meaker, who has done more perhaps than any other physician to call attention to the need for really careful investigation of both husband and wife if children are wanted and have failed to appear. In at least 70 per cent. of cases of human sterility the cause is not some single abnormality but rather the summation of several factors. Some of these may be genital and some may be constitutional; and they are seldom limited to one partner. Meaker and his associates state that only about 10 per cent. of the husbands and 5 per cent. of the wives that consult them for childlessness are free from all objectively demonstrable evidence of infertility. In women the four most important gynæcological abnormalities are genital hypoplasia, abnormal viscosity of the endocervical secretions, partial or complete obstruction of the Fallopian tubes, and faulty ovulation. The most difficult of these to detect is the last; for no method of examination has been devised that will show whether or not the ovaries actually liberate mature and normal eggs. In treatment Meaker would have us correct every factor demonstrated as inimical to fertility. A therapeutic approach from several directions gives results far better than those obtained in older days

when attention was directed only towards single items. Of these, one of the most important is of course examination of the semen, and R. S. Hotchkiss points out that this is now done not so much to detect absolute sterility as to provide an estimate of the degree of fertility of the male partner. This he assesses according to the total volume of the ejaculate, the motility of the spermatozoa, the *p*H of the semen, the number of spermatozoa present, and their appearance and the ratio of abnormal to normal forms present. Dealing with the operative treatment of sterility in the male, F. R. Hagner maintains that the use of fine silver wire as a suturing material is an important factor in the success of his modification of the original Martin operation of baso-epididymostomy. The other points that he brings out are the necessity of ensuring that spermatozoa are present in the head of the epididymis, and that the lower end of the vas is patent before carrying out anastomosis. The symposium concludes with a consideration of endocrine factors by Richard Chute. Inadequate function of the anterior pituitary, the ovary, and the thyroid may, any of them, he says, be mainly responsible for sterility. Hypopituitarism is the commonest dysfunction recognised and the use of anterior pituitary hormones is most often advisable, but thyroid extract may also be very useful. According to Chute the injection of gonad substances—i.e., substitution therapy—not only does not stimulate the gonads, but is liable to injure them.

THE DANGERS OF BEING ADMITTED TO A CHILDREN'S WARD

THAT a young child may suffer more from the effects than from the cause of admission to hospital has given much anxiety to those in charge of children's wards, particularly in fever hospitals. Though it is still impossible entirely to prevent the common but dangerous infections, much can be done to reduce them by having an efficient staff, by the better planning and ventilation and the greater subdivision of wards, and by passive immunisation. A leading article in our own columns a few years ago [1] was followed by an illuminating correspondence about the abolition of unnecessary risks. The result of treating pyloric stenosis was instanced by J. C. Spence, in Newcastle-upon-Tyne, and by D. Paterson, in London; in private practice a mortality of 1–10 per cent. was to be expected, while in hospital, with a highly skilled staff, it might exceed 30 per cent. Later, in his Milroy lectures for 1935, E. H. R. Harries [2] spoke of the overwhelming importance of upper respiratory tract infections, the need for a staff "numerically and technically adequate" to cope with their special dangers, and the reforms required in architecture and administration. While some still believe that well-planned large wards can be efficient as well as economical, the majority have as an ideal the small ward unit with one or two beds in each cubicle, as in Hutinel's "boxes," famous since the beginning of the century. In these a ward was subdivided by glass partitions into two-bed cubicles, each with its own window and equipment. This method will prevent all infections except from the early stages of measles and especially of chicken-pox, for which complete separation and asepsis would be necessary. In an ordinary ward the simple "barrier" system of isolation is effective, as described recently by C. C. Okell and S. D. Elliott.[3] Prevention largely depends on the space between beds, but even with the regulation three feet B. E. Schlesinger found [4] that the simple expedient of placing beds alternately from head to foot was alone enough to ensure that cases remained sporadic which in the past would have led to minor epidemics. Better recognised than droplet infection, although no less to be feared, is the gastro-enteritis of infants, which can only be avoided by the efficiency of the nursing staff. As D. Nabarro and A. G. Signy have suggested,[5] the most important precaution is a staff large enough to ensure that no nurse is responsible for more than one or two patients, that no nurse should handle stools who has to prepare meals, and that the working hours should not be so long that standards are relaxed.

At his hospital in Paris Prof. Robert Debré has organised a special service for the prevention and detection of cross-infection, and has put at its head a whole-time medical officer with special clinical and laboratory qualifications for his task. Largely owing to his initiative a special committee was appointed by the Academy of Medicine to study the problem, and the Academy have now passed certain resolutions embodying its principal findings. Separate cubicles, they recommend, should be adopted by all children's hospitals. In addition steps ought to be taken to prevent contacts in the special departments among the young in-patients and between these and children coming from the outer world. As Prof. Debré pointed out, the meeting of children at these cross-roads is a most pernicious source of intra-hospital infections. Stricter measures than heretofore are to be taken in the prophylactic discipline imposed on the nursing and medical staff and on medical students. It is essential for these to wear overalls and masks, and to be forbidden indiscriminate access to the cubicles of particularly delicate infants. Visits by relatives should also be forbidden in infants' wards, and should be strictly regulated in the wards of older children. In out-patient consultations suspect children should be more effectively combed out, if necessary by the addition of a supplementary intern. It is particularly recommended by the Academy that all in charge of children's hospitals should imitate the reforms already introduced into Prof. Debré's hospital, where lately the incidence of infections has been greatly reduced.

PUBLIC SOCIAL SERVICES

ANYBODY who has the time and inclination to read through a little handbook issued by the National Council of Social Service, and now in its seventh edition,[6] will be left with a sense that if all local authorities exercised to the full their powers, permissive and obligatory, no member of the community need ever go uncared for from the cradle to the grave. Provision, and generally very humane provision, is made for nursing and expectant mothers, for infants and children, for physical and mental defectives, the destitute, the sick and the disabled, the aged and the hungry, and indeed for every citizen whose circumstances genuinely call for assistance. In some cases Scotland is ahead of England: for example, while education authorities in England may provide meals for needy school-children at their discretion, in Scotland such provision is laid upon the authorities as a duty, and the same is true of the

[1] *Lancet*, 1933, 1, 370.
[2] *Ibid*, 1935, 2, 173, 233.
[3] *Ibid*, 1936, 2, 836.
[4] *Ibid*, 1933, 1, 611.
[5] *Ibid*, p. 550.
[6] From the Council at 26, Bedford-square, London, W.C.1. Pp. 164. 2*s*. (post free).

provision of certain kinds of secondary education. The handbook was originally published as a pamphlet in 1917, was revised and enlarged in 1920, and has now again been revised and brought up to date. Besides a comprehensive survey of the social services, including national health and pensions insurance, it contains in concise form an immense amount of information about conditions of industry and employment, the administration of justice in the various courts, and a chapter on war pensions and allowances. While the handbook must be invaluable in the offices of public health departments and the various government departments engaged in administering the social services, there will be many other workers, both official and voluntary, who will find it a very useful work of reference.

EXERCISING THE LIVER

IT may be contrary to the general rule of rest in active disease to exercise a damaged organ, but it is not necessarily so in all types or at all stages. Since much visceral activity appears to be rhythmical, there is certainly physiological support for applying the principle of alternate rest and work to certain diseased tissues. Prof. Pribram has suggested an interesting and novel therapeutic method, based upon his work on liver-cell function, in which rhythmic rest and work can be made to improve functional activity in an organ like the liver. From his study of hepatitis, both with and without gall-bladder disease, he believes œdema of the liver, to which a great part of the clinical enlargement is due, to be an important feature of these conditions. The improvement noticed after intravenous injections of hypertonic glucose solutions is due not so much to the action of the glucose itself as to the withdrawal of fluid by osmosis from the liver depôts, for a similar diminution in size can be obtained by using hypertonic saline. Many livers seriously diseased, as in cirrhosis, and with grossly impaired function, are not deficient in glycogen, and treatment with glucose, with or without insulin, must clearly have its limitations. For one thing the optimum benefit is likely to be reached quickly, since a liver deficient in glycogen will quickly replenish its stores under treatment, and further improvement in function may cease when maximum storage is reached. In the hope that certain types of liver disease, especially cirrhosis, might respond to stimulation as well as to "protection" by glucose, Prof. Pribram has tried the effect of alternately increasing and diminishing glycogen activity—and perhaps other activities—by using insulin and thyroxine on different days. The anabolic or resting phase is produced by the injection of 20 c.cm. of a 40 per cent. glucose solution with 8 units of insulin; the katabolic phase by 1 c.cm. of 1/1000 thyroxine solution intramuscularly. By these two opposing treatments he believes that the functional activity of the liver cells is raised, and from his results it seems that his hopes are well founded. As one means of estimating the effect of this "Zell-gymnastik," Prof. Pribram has studied the water balance in cases of cirrhosis of the liver, and the diuretic effect of the treatment appears greatly to outweigh that produced by either insulin-glucose treatment alone, or any other method he has tried, including of course such mercurials as Salyrgan. In general Prof. Pibram has applied these original methods to cases of liver œdema and enlargement, but he suggests that the principle involved may be applied to other organs and other diseases. This work is one that will arouse interest, and it should lead to further research. Clearly criticisms are not hard to make, but at least it may help in questioning the view that all rest and no work must be the best treatment for diseased viscera.

[1] Pribram, B. O. (1936) *Münch. med. Wschr.* **83**, 1993.

A WORD TO CONTRIBUTORS

NATURE of her abundance is always creating new varieties, new species, new methods; with every passing year each animal and plant tends to become less like its ancestors and less like its cousins. The same thing happens to scientific journals; they grow different in appearance and they eat different food. This is awkward for those who feed them, and contributors are often heard to complain, for example, that a form of references demanded by one journal will be rejected with contumely by another. In these circumstances the publications committee of the Royal Society has been trying to devise a basal diet that all will accept, and has been asking editors in this country to give up some of their peculiar fads and adopt henceforward the Harvard System of Bibliographical Reference, with whatever local modifications may be necessary to make it palatable. This we have done at the beginning of the New Year, and we have taken the opportunity at the same time to issue a small supplement, "On Writing for THE LANCET," which we hope may be useful as a cookery manual for those who obligingly keep us alive.

FURTHER EXPERIENCE WITH DIVINYL ETHER

DIVINYL ether, vinethene, has not been used by anæsthetists long enough for its exact value to be clearly demonstrated. The publication of the paper concerning over 2600 administrations is a step towards this end. In *Anesthesia and Analgesia* for September–October, 1936, G. W. Black makes plain both the limitations and the peculiar advantages of the drug. It is obvious that, as was anticipated, vinethene unaided is not a good anæsthetic for long operations requiring full relaxation. Black disapproves of it in these conditions because of its extreme volatility and the difficulty in consequence of preserving a level plane of narcosis. Other authorities have disliked long administrations because of their anxiety about untoward effects on the liver—though Wesley Bourne has shown that, experimentally at least, these fears are groundless. On the other hand for short operations vinethene has many attractions. It is remarkably quick in its action, is not nearly so irritating as ethyl ether, and produces better relaxation than nitrous oxide, recovery being almost as quick and complete. Experience is needed before the best can be got from vinethene, especially as the signs of anæsthesia are not precisely the same as those usually relied on; for example, anæsthesia may be perfect with a rolling eyeball and an active lid reflex. It has to be given with very free dilution by air or oxygen, and it is admirably adapted for the induction of anæsthesia in children.

Dr. Harrington Sainsbury, who died on Dec. 29th in his 84th year, was consulting physician to the Royal Free and City of London Hospitals. He took a lifelong interest in the action of drugs and the principles underlying their administration, and wrote on the subject with charming erudition.

A SPECIAL conference of local medical and panel committees has been called for Jan. 7th to discuss the capitation fee payable for young persons to be brought under National Health Insurance by the Government's new legislation (see THE LANCET, Dec. 5th, 1936, p. 1340). A note on the proposals appears on p. 60.

PRINCIPLES OF MEDICAL STATISTICS

I.—THE AIM OF THE STATISTICAL METHOD

"Is the application of the numerical method to the subject matter of medicine a trivial and time-wasting ingenuity as some hold, or is it an important stage in the development of our art, as others proclaim?"

WHATEVER may be our reactions to that question, propounded by Prof. Major Greenwood in these columns[1] fifteen years ago, it must be admitted that in the years intervening between 1921 and to-day there has been a substantial increase in the number of papers contributed to medical journals of which the essence is largely statistical. Not only does there appear to be an enhanced knowledge of and respect for the national registers of life and death which the Registrar-Generals of the United Kingdom annually publish and analyse, but there is an increasing number of workers who endeavour to apply numerical methods of analysis to their records obtained in clinical medicine. The great majority of such workers, however, have had, naturally enough, little or no training in statistical method and many of them would find the more mathematical methods of the professional statistician, as has been said, "obscure and even repellent." Often enough, indeed, the argument is put forward that the use of such mathematical methods is quite unjustifiable, that the accuracy of the original material is not sufficient to bear the weight of the treatment meted out to it. This assertion is not strictly logical. If a collection of figures is worth a statistical analysis at all, it is, obviously, worth the best form of statistical analysis—i.e., the form which allows the maximum amount of information to be derived from the data.

Whether mathematical statistical methods *are* the best form in particular cases or may be regarded as an unnecessary elaboration must turn rather upon this question: Can we in any of the problems of medical statistics reach satisfactory results by means of relatively simple numerical methods only? Or upon this question: Can we satisfactorily test hypotheses and draw deductions from data that have been analysed by means of such simple methods? Personally I believe the answer to these questions is an unqualified yes, that many of the figures included in medical papers can by relatively simple statistical methods be made to yield information of value, that where the yield is less than that which might be obtained by more erudite methods which are not at the worker's command the best should not be made the enemy of the good, and that even the simplest statistical analysis carried out logically and carefully is an aid to clear thinking with regard to the meaning and limitations of the original records. If these conclusions are accepted, the question immediately at issue becomes this: Are simple methods of the interpretation of figures only a synonym for common sense or do they involve an art or knowledge which can be imparted? Familiarity with medical statistics leads inevitably to the conclusion that common sense is *not* enough. Mistakes which when pointed out look extremely foolish are quite frequently made by intelligent persons, and the same mistakes, or types of mistakes, crop up again and again. There is often lacking what has been called a "statistical tact, which is rather more than simple good sense." That tact the majority of persons must acquire (with a minority it is undoubtedly innate) by a study of the basic principles of statistical method.

It is my object in these articles to discuss these basic principles in an elementary way and to point out by representative examples taken from medical literature how these principles are frequently forgotten or ignored. I very much fear that the discussion will often appear too simple and that some of the mistakes to which space is given will be thought too futile to need attention. I am only persuaded that such is not the case by the recurrence of these mistakes and the neglect of these elementary principles, a feature with which every professional statistician is familiar in the papers submitted to him by their authors for "counsel's opinion."

Definition of Statistics

Whereas the laboratory worker can frequently exclude variables in which he is not interested and confine his attention to one or more controlled factors at a time, the clinician and social worker have to use records which they know may be influenced by factors which they cannot control but have essentially to be taken into account. The essence of the statistical method lies in the elucidation of the effects of these multiple causes. By statistics, therefore, we mean "quantitative data affected to a marked extent by a multiplicity of causes," and by statistical method "methods specially adapted to the elucidation of quantitative data affected by a multiplicity of causes" (G. U. Yule: An Introduction to the Theory of Statistics, 1927). For example, suppose we have a number of children all of whom have been in contact with measles and to a proportion of them is given an injection of convalescent serum. We wish to know whether the treatment prevents the development of a clinical attack. It is possible that the risk of developing an attack is influenced by age, by sex, by social class and all that that denotes, by duration and intimacy of contact, by general state of health. A statistical analysis necessitates attention to *all* these possible influences. We must endeavour to equalise the groups we compare in every possibly influential respect except in the one factor at issue—namely, serum treatment. If we have been unable to equalise the groups ab initio we must equalise them to the utmost extent by the mode of analysis. As far as possible it is clear, however, that we should endeavour to eliminate, or allow for, these extraneous or disturbing causes when the experiment is planned; in a carefully planned experiment we may determine not only whether serum is of value but whether it is more efficacious at one age than another, &c. It is a serious mistake to rely upon the statistical method to eliminate disturbing factors at the completion of the work. *No* statistical method can compensate for a badly planned experiment.

Planning and Interpretation of Experiments

It follows that the statistician may be able to advise upon the statistical lines an experiment such as that referred to above should follow. Elaborate experiments can be planned in which quite a number of factors can be taken into account statistically at the same time (R. A. Fisher: The Design of Experiments, 1935). It is not possible to discuss such methods here and attention is confined to the type of simple experimental lay out with which medical workers are familiar. Limitation of the discussion to that type must not be taken to mean

[1] Medical Statistics (1921) *Lancet*, 1, 985.

that it is the best form of experiment in a particular case.

The essence of the problem in a simple experiment is, as emphasised above, to ensure beforehand that, as far as is possible, the control and treated groups are the same in all *relevant* respects. The word relevant needs emphasis for two reasons. First, it is obvious that no statistician can be aware of all the factors that are, or may be, relevant in particular medical problems. From general experience he may be able to suggest certain broad disturbing causes which should be considered in planning the experiment (such as age and sex in the example above) but with factors which are narrowly specific to a particular problem he cannot be expected to be familiar. The onus of knowing what is likely to be relevant in a specific problem must rest upon the experimenter who is, presumably, familiar with that narrow field. Thus, when the statistician's help is required it is his task to suggest means of allowing for the disturbing causes, either in planning the experiment or in analysing the results, and not, as a rule, to determine what *are* the relevant disturbing causes.

The second point that must be observed as regards the equality of groups in all relevant respects is the caution that must attend the interpretation of statistical results. If we find that Group A differs from Group B in some characteristic, say, its mortality-rate, can we be certain that that difference is due to the fact that Group A was inoculated (for example) and Group B was uninoculated? Are we certain that Group A does not differ from Group B in some other character relevant to the issues as well as in the presence or absence of inoculation? For instance, in a particular case, inoculated persons might, on the average, belong to a higher social class than the uninoculated and therefore live in surroundings in which the risk of infection was less. We can never be *certain* that we have not overlooked some relevant factor or that some factor is not present which could not be foreseen or identified. It is because he knows a complex chain of causation is so often involved that the statistician is, as it appears to many persons, an unduly cautious and sceptical individual.

The reason why in experiments in the treatment of disease the allocation of alternate cases to the treated and untreated groups is often satisfactory, is because no conscious or unconscious bias can enter in, as it may in any selection of cases, and because *in the long run* we can fairly rely upon this random allotment of the patients to equalise in the two groups the distribution of other characteristics that may be important. Between the individuals within each group there will often be wide differences in characteristics, for instance in body-weight and state of health, but with *large* numbers we can be reasonably sure that the numbers of each type will be equally, or nearly equally, represented in both groups. If it be known that certain characteristics will have an influence upon the results of treatment and on account of relatively small numbers the distribution of these characteristics may not be equalised in the final groups, it is advisable to extend this method of allocation. For instance, alternate persons will not be treated but a division will be made by sex, so that the first male is treated and the second male untreated, the first female is treated and the second female untreated. Similarly age may be equalised by treating alternate males and alternate females at each age, or in each broad age-group if individuals whose ages are within a few years of one another may in the particular case be regarded as equivalent.

AN EXAMPLE

Even if in planning the experiment factors such as age and sex have thus been equalised in the two groups, the analysis of the results should never be directed only to the effects of treatment upon the totals. It is possible that treatment may be more effective at one age than at another and this difference will be lost sight of if the groups as a whole are alone compared. As far as the number of observations allow, comparison should be made between sub-groups differentiated by any factors that may be of importance. As an example of this experimental method and analysis may be cited the report of the Therapeutic Trials Committee of the Medical Research Council on the serum treatment of lobar pneumonia (*Brit. med. J.* 1934, **1**, 241). In each of three centres, London, Edinburgh, and Aberdeen, it was arranged that alternate cases taken in order of their admission to hospital should be treated with serum, both treated and untreated being so far as possible in the same wards and under the care of the same physicians. "It was thought better not to attempt a deliberate sorting of cases in respect of mildness or severity, but to trust that the distortion of chance scatter would become almost negligible in a fairly large number of cases." Age, it will be observed, was not equalised in the allotment of cases, and as fatality from lobar pneumonia certainly varies with age the analysis must first show whether the serum and control groups are equivalent in that respect. The random allocation of patients has, in fact, not quite equalised the groups in that factor. Taking the figures for London and Aberdeen (in Edinburgh the method was not fully carried out) and combining Types I and II, the numbers in two broad age-groups were:—

Age.	Number of patients.		Percentage in each age-group.	
	Controls.	Serum treated.	Controls.	Serum treated.
20–40 ..	104	123	65	75
40–60 ..	55	40	35	25
Total ..	159	163	100	100

Roughly 35 per cent. of the control cases were of ages 40–60 and only 25 per cent. of the serum-treated. It follows that the comparison of results must essentially be made within, at least, these two age-groups. If a lower fatality-rate is found in the serum-treated when the total groups are compared, this result may merely be a reflection of the fact that 10 per cent. less of these patients belonged to the ages at which fatality is normally higher and, correspondingly, 10 per cent. more belonged to the ages at which fatality is normally lower. In other words, as the method of allotment has not equalised the groups in an important respect with regard to fatality, the method of analysis must do so.

It is impossible to ignore the fact that in the random allocation of patients to the treated and untreated categories a difficult moral issue is often raised. The treatment is usually based on a priori evidence which suggests that it should have some curative effect. Can it, then, be justifiably withheld from any patient? And if it is withheld how extensive a trial is justifiable? There are no easy answers to these

questions. There can be no doubt that any new therapeutic measure *should* be given a period of trial before coming into general use. If the results of such a measure are dramatic in the light of all past experience, then clearly the trial period will not need to be prolonged. But one must be careful of the interpretation of "dramatic"; it must imply something strikingly different from all previous experience, not merely a run of a few successes where some failures might well have been expected. Such dramatic events are unfortunately the exception. More usually the effect of the new measure will be relatively small, though none the less important, and therefore its presence (or absence) be difficult to detect in small-scale tests. Such tests may well give contradictory and confusing answers. They may enable a useless measure to hold for years a position it does not merit (sometimes, perhaps, to the exclusion of more worthy measures); they may even prevent a really valuable form of treatment obtaining the general recognition it deserves. A well-planned and extensive trial (such as has been carried out with measles serum) would obviate such undesirable results, and thereby possibly save more suffering in the long run than is incurred in the trial itself, and more speedily than the indeterminate results given by inadequate tests would allow.

Summary

The statistical method is required in the interpretation of figures which are at the mercy of numerous influences, and its object is to determine whether individual influences can be isolated and their effects measured. The essence of the method lies in the determination that we are really comparing like with like, and that we have not overlooked a relevant factor which is present in Group A and absent from Group B. In experiments involving the treatment of a number of patients who are to be compared with controls not given the specific treatment, any deliberate choice of individuals to be treated may lead, unconsciously, to the treated group differing from the untreated group in some characteristic which, known or unknown, has an influence upon the results. If the series of cases is large, a random allocation of individuals—e.g., by cases being alternately placed in the treated and untreated groups—may reasonably be relied upon to equalise the two groups in all characteristics except the one under examination. Such a method of allocation does not obviate the necessity of testing in the statistical analysis of the results whether in fact the groups are equal in all characteristics which are believed to be relevant.

A. BRADFORD HILL.

SPECIAL ARTICLES

INCIDENCE OF ANÆMIA IN PREGNANCY

INFLUENCE OF SOCIAL CIRCUMSTANCES AND OTHER FACTORS

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A SERIES of 1108 pregnant women was examined. There was no selection of cases either as to social circumstances or as to parity, the patients being those who attended the Stockport corporation antenatal clinics. The Haldane hæmoglobinometer was used, and the hæmoglobin estimations were all made by one of us (J. M. M.). The examinations extended over about two years, and were more or less evenly distributed throughout the seasons. About half the women were examined in the forenoon and the rest in the afternoon. Some 72 per cent. of the examinations were made between the twenty-sixth and the thirty-second week of pregnancy, and only 7 per cent. after the thirty-sixth week. The age and parity distribution of the women is shown in Table I.

Incidence of Hyperchromic Anæmia.—In all cases showing a reading of 70 per cent. of hæmoglobin and under, blood films were prepared and examined by one of us (W. J. S. R.). No case of pernicious anæmia was found. It may be recalled that Evans, who examined 4083 patients, "found no case of severe anæmia."

Incidence of Hypochromic Anæmia.—Amongst our cases we found that 45·9 per cent. gave a hæmoglobin reading of 86 per cent. and over, 43·9 per cent. showed a reading between 70 and 84 per cent., and 10·2 per cent. gave a reading below 70 per cent. Davidson and his colleagues in Aberdeen (1935) in an examination of 819 pregnant women, found 17·5 per cent. with a hæmoglobin reading below 70 per cent. Helen Mackay (1935) in London examined 109 pregnant women and found 4·6 per cent. with a hæmoglobin reading below 70. Boycott (1936), also working in London, in a series of 222 cases found 11 per cent. of his cases gave a reading below 70. All these workers used the Haldane method. American investigators, Moore (1929), Lyon (1929), Galloway (1929), Adair, Bland, Goldstein, First (1930), with various methods of estimation, examined groups of cases ranging from 100 to 1176 in number, and found a much greater incidence of anæmia in pregnancy. They give figures ranging from 19 to 81 per cent. of patients with less than 70 per cent. hæmoglobin.

TABLE I

Age-group.	Parity.													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	
20 and under.	75	14	2	—	—	—	—	—	—	—	—	—	—	91
21–25	205	92	27	12	2	1	—	—	—	—	—	—	—	339
26–30	117	99	79	25	18	11	—	—	—	—	—	—	—	349
31–35	31	40	29	36	28	10	12	7	4	1	1	—	—	199
36–40	8	19	6	14	11	11	8	3	6	3	3	4	—	96
41 and over.	4	1	5	2	6	4	3	2	1	3	2	—	1	34
Total	440	265	148	89	65	37	23	12	11	7	6	4	1	1108

Effect of Social Circumstances.—In order to determine whether economic circumstances had any effect, we divided our patients into two groups, according to the average income per head of the family per week after deduction of rent. Group I. comprised those women whose family income amounted to an average of 12*s.* per head per week or less; Group II. those with an average over 12*s.* per head. It was possible to assess the income in each case with a considerable degree of accuracy from office

records and the personal knowledge that the health visitors have of each family. For this purpose the pregnant woman is counted as two, so that, for example, when dealing with a primipara, she would be in Group I. if the family income after deduction of rent was 36s. per week or less, and in Group II. if over that amount. Table II. shows the results of such a comparison.

TABLE II

—	Social group.	Total in group.	Number below Hb. 70.	Per cent. below Hb. 70.
Whole series	I.	710	93	13·2
	II.	398	20	5·0
Primiparæ	I.	211	16	7·6
	II.	229	10	4·4
Multiparæ	I.	499	77	15·4
	II.	169	10	5·9

Whether the figures are taken as a whole or divided into the two groups of primiparæ and multiparæ, it is found that the percentage in Group I. showing a hæmoglobin reading below 70 is considerably greater than in Group II. It appears, therefore, that the social circumstances have a definite influence on the hæmoglobin readings. This is in accordance with the findings of Bland, Goldstein, and First (1930). Boycott (1936), on the other hand, was unable to find any correlation between the hæmoglobin level and the social circumstances.

Influence of Multiparity.—Bland, Goldstein, and First do not consider that parity has any relation to a low percentage of hæmoglobin. Neither Helen Mackay (1935) nor Boycott (1936) was able to obtain conclusive results.

In our series the percentage of patients giving a hæmoglobin reading below 70 in Group II. of both primiparæ and multiparæ is about 5, but in Group I. there is a conspicuous difference between the primiparæ and multiparæ—i.e., 7·6 compared with 15·4. To investigate this point further, the multiparæ were divided into two groups, those with two to four pregnancies in one group, and those with five or more pregnancies in the other group. The results are shown in Table III.

TABLE III

—	Per cent. below Hb. 70		
	Total.	Social group	
		I.	II.
Primiparæ ..	5·9	7·6	4·4
2–4 para	12·1	15·1	4·6
5-para and over ..	15·7	15·5	16·7

When social Group II. is studied, it is found that the percentage with a hæmoglobin reading below 70 is about the same for primapara and for those women with two to four pregnancies, but that among the women with five or more pregnancies the percentage with a hæmoglobin reading below 70 is three times as great. Multiparity, therefore, in good social circumstances, appears to begin to exercise a definite effect only when the women have had five or more pregnancies. In poorer social circumstances multiparity appears to have an effect on the hæmoglobin level at an earlier stage. This effect is no doubt accentuated by the fact, well known to all social workers, that when the economic circumstances are poor, the mother almost without exception sacrifices her own interests to those of the rest of the family. In better social circumstances no such sacrifice is called for.

Influence of Ages.—Age is another factor which may be considered. Bland, Goldstein, and First (1930) concluded that age did not influence the incidence of moderate or severe anæmia. Mackay (1935) found no change with increasing age. Boycott (1936) also found no correlation between age and the hæmoglobin level.

To exclude the influence of parity, primiparæ only were considered in this connexion. Two groups were taken: those under 21 years of age, and those of 31 and over. The results are shown in Table IV.

TABLE IV

—	Age.	Per cent. below Hb. 70.		
		Total.	Social group	
			I.	II.
Primiparæ only.	Under 21.	8·0	9·5	6·1
	31 and over.	6·9	17·6	—

Age seems to have no influence, but the influence of social circumstances is once again manifest.

Effect of Work.—A considerable proportion of women in the north-western area work at various trades during pregnancy. In the series 318 women worked outside their own homes during pregnancy, and 790 did their ordinary household work. Of the outside workers, 7·5 per cent. had a hæmoglobin value below 70, and of those who worked at home 11·3 per cent. had a value below 70. When they are separated into primiparæ and multiparæ, and again subdivided into the two social groups, the difference between the workers and non-workers disappears, as Table V. shows.

TABLE V

—	—	Per cent. below Hb. 70.		
		Total.	Social group	
			I.	II.
Primiparæ.	Workers.	5·9	7·2	4·2
	Non-workers.	5·9	8·1	4·5
Multiparæ.	Workers.	11·3	14·7	3·4
	Non-workers.	13·3	15·5	6·4

Again the influence of social circumstances is apparent, and especially among the multiparæ in social Group II., where the influence of the addition of the woman's wage to the family income is clearly shown in the low percentage of those giving a reading below 70.

Influence of Abnormality in Pregnancy.—It was not possible to trace any influence from this cause on the hæmoglobin level.

It is proposed in a further paper to study the influence of the anæmia on the subsequent history of mother and child. So far, from a preliminary examination, we have been unable to trace any influence on the maternal death-rate, the stillbirth-rate, or the neonatal death-rate.

SUMMARY

(1) The hæmoglobin level was estimated in 1108 pregnant women, and 10·2 per cent. of them gave a

reading below 70 per cent. (2) The anæmia was always hypochromic. (3) When the women were divided into two groups according to the family income it was found that the incidence of anæmia was higher in the lower income group. (4) Multiparity in good social circumstances did not appear to have much influence, except in women with five or more pregnancies. (5) Age, work outside the home, or abnormality in pregnancy, had no recognisable influence on the degree of anæmia.

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A SOVIET HEALTH RESORT

(FROM A CORRESPONDENT LATELY TREATED THERE)

KISLOVODSK, situated in the mountainous region of the Northern Caucasus, has in the past few years become one of the most frequented and highly developed spas of the Soviet Union. Large further development is planned for the next ten years, including a hotel and sanatorium for foreign visitors. The object of this ten years' plan of construction is full utilisation of the natural resources of the locality: the climate and mineral-gaseous springs.

The centre of the town is 800 m. above sea level, but some of the new sanatoriums are at a height of 1000 m. It lies in a narrow valley, protected from the wind on all sides but the north. Its climate is sub-alpine, and the "season" is from June to March, March, April, and May being rainy months. The summer is hot but not oppressive, for the nights are always cool. The autumn and winter are dry and sunny, and there are more hours of sunshine than at Davos. Some sanatoriums close for repairs and spring-cleaning during the rainy months, but the spa functions all the year round.

The mineral, gaseous water of Kislovodsk, *Narzan*, was appreciated by the ancient inhabitants of the region, the Abhasians, and was called by them *Nard-san*—i.e., "athlete water." Its composition is compared to that of Bad-Nauheim; narzan having 1·96 g. free carbonic acid gas per litre; Nauheim water, 3·9; narzan 4·4 g. mineralisation and Nauheim 29·10. The main narzan spring gives 2,000,000 litres of water a day. An equally gaseous but more highly mineral spring gives 700 litres. Narzan No. 1 is bottled as a table water, but its great therapeutic use is in baths. Narzan No. 2 is not used for baths, but is considered valuable for certain digestive disorders.

The principal spring has long been protected from pollution and made available for both drinking and baths. The first bath-house was built in 1803, and one equipped with English porcelain baths, still in use, was erected between 1910 and 1914; but there were no sanatoriums and no permanent medical service before the end of the Civil War.

The planned development of the Caucasian spas along with the other health resorts of the Soviet Union began in 1924, when the All-Union Central Organisation of Health Resorts was established in Moscow. It appoints a director in each spa who, with his staff, controls the medical treatment on the spa territory. The four Caucasian spas with their rich and varied mineral and radio-active springs and mud baths are in close touch for medical, research, and administrative purposes. The local sanatoriums are controlled by various bodies, but they conform to the principles of medical treatment laid down by the spa management. These principles are based on the research work carried out in the appropriate health resort scientific institute—for instance, at the State Central Institute for the Study of Health Resorts, at the State Institute of Medical Climatology and Climate Therapy in Moscow, or at the State Balneological Institute at Piatigorsk, which is the scientific headquarters of the Caucasian spas. Each institute publishes the results of its researches in three or four yearly volumes; there is a monthly journal of the health resort medical service and conferences of the health resort specialists are periodically called. Some sanatoriums also carry on independent research. Detailed records of all patients are kept at all sanatoriums, and their previous and subsequent health history is available. The central organisation coördinates all this work and directs the lines of research.

THE SANATORIUMS AND THEIR PATIENTS

The patients do not themselves pay for the treatment they receive, but they may pay for part or all of their board and lodging. The trade union or organisation for which a patient has been working pays for his medical treatment and for the balance of his board. The capital expenditure of the spa is covered by State or trade union grants. This means that enormous sums are being spent by the State on the development and upkeep of the spas and that this expenditure must be justified by a careful selection of those patients who will benefit most in the shortest time by the treatment that a given spa provides.

In each industrial or rural health service organisation a commission of two or three health resort specialists makes the final selection from patients referred to them, after considering the value and capacity of every health resort in the Soviet Union. Kislovodsk, for instance, would benefit a very large range of patients by reason of its excellent climate, but its water makes it specially suitable for the treatment of diseases of the heart and vascular system, with or without certain nervous disturbances and minor affections of the lungs. Acute heart cases, those with renal disease, and some types of nervous disorder are not sent to Kislovodsk, either because they would not profit by it or because they would interfere with the other patients.

Though patients can and do get lodgings in private homes or in hostels and receive out-patient treatment in the spa clinics, this is regarded as a stop-gap arrangement. The development of Kislovodsk as a health centre is based on the sanatorium, designed to give the patient the utmost comfort and rest and equipped with most or all of the apparatus necessary for treatment.

Within the last twelve years some 55 sanatoriums have been established; 13 belonging to the Central Health Resort Organisation, 14 to different trade unions, and the remainder to the various ministries, the health ministries of the national minorites, particular factories or industries, the coöperatives, and other organisations. Some of the sanatoriums are old villas adapted and enlarged, but most are

spacious new buildings housing 100–250 patients in rooms with one to four beds, and hot and cold running water, and balconies with couches or easy chairs. The allocation of rooms varies according to the management of the sanatorium. For instance, in that of the Ministry of Agriculture half the rooms are single, and they are allocated on medical grounds to the patients who would be likely to disturb roommates; in the sanatorium for savants, one of the most luxurious, double rooms are provided only for married couples, and there are a number of suites of two rooms for academicians; and in the newest trade union sanatorium for industrial workers the majority of rooms are for three or four, and the few single rooms are generally allotted to children who, for family reasons, are obliged to accompany a parent who is a patient. The State Bank workers' sanatorium has nothing but double rooms. There is a generous allowance of bath and shower rooms per corridor.

Almost every sanatorium has its hydrotherapy department where pine extract and other medicated baths and various douches are given. This form of treatment for nervous patients is very widely practised in the Soviet Union. In some of the central sanatoriums the narzan water is laid on and the baths can be taken on the premises, but as a rule the patients are transported by motor omnibus from their sanatorium to the central pre-war bath-house and the new October Baths. Both establishments are open twelve hours a day. Patients receive a week's supply of tickets giving time of appointment and number of bath cubicle from their nurse at the sanatorium. The cubicles are well ventilated, there is a rest room with as many divans as cubicles, and a physician is always in attendance. Each sanatorium has its electro-cabinet equipped for light treatment, galvanisation, d'Arsonvalisation, faradisation, ionisation, and diathermy. Most have dentists' consulting-rooms, X ray cabinets, and laboratories for clinical tests. Neighbouring sanatoriums sometimes share each others' laboratories and X ray apparatus, or the central spa establishments may be used.

The sanatorium staff consists of about one doctor for fifty patients besides the sanatorium director, who is generally also chief physician, though his duties are mainly administrative, and there are also a number of visiting specialists. There are trained nurses always on duty, several masseuses, and at least one gymnastic instructor who has specialised in remedial gymnastics. In the new trade union sanatorium for 250 patients there are three gymnastic instructors, and at the time of my visit there were fifteen different groups of patients for remedial exercises. An open-air sports' ground and indoor gymnasium as well as a gymnastic apparatus room are provided.

The sanatorium dining-room is generally a light and spacious room furnished with tables for four. Three substantial meals and a light tea or supper are provided on restaurant lines—i.e., there is a fair choice of dishes and several courses at each meal. Each sanatorium has its dietitian, and in most cases the head cook has been trained or has had part of his training at Prof. Pevsners's dietetic hospital in Moscow. Regulations insist that the head cook, as indeed all specialists, shall be sent to their training institute for refresher courses every year. The organisation of diets varies from sanatorium to sanatorium. The fullest development is seen in the savants' sanatorium where fourteen basic diets are recognised; the tables are numbered accordingly and each dish on the menu has against it the diet number for which it is allowed. Happy the patient on diet number fourteen, for he may partake of every dish! The prominence given to dietetics is partly due to the prevalence of intestinal disorders in a country where typhoid and dysentery are still fairly common, and partly to the fact that market gardening and poultry, dairy, and fruit farming are still little developed in the outlying parts of the Soviet Union. The spa has had to organise its own "food base." Many sanatoriums have their home farm, but at a considerable distance over unmade roads. Cooks must be skilful to produce balanced, tasty, and digestible meals out of somewhat coarse and limited products. Moreover patients come from all over the Union, many from places more distant and different in climate and food conditions than even England; from Yakutia, Turkmenistan, Karelia, and Mongolia, for instance; and they need education in choice of food. In addition to these considerations much research is being done on the dietetic treatment of rheumatism and gout, and many Kislovodsk patients are being treated for obesity. In cases which permit of it the "terrain-cure" is used for overweight. The great public park is traversed by carefully graded and measured walks, plentifully provided with seats, and leading up the hillsides. The doctor's prescriptions may include two daily walks to the Red Sun hill-top or one up the Little Saddle.

AMUSEMENT AND TREATMENT

Entertainment, considered as culture and education, is organised by a member of the staff, generally one of the gymnastic instructors. The big sanatoriums have their concert and dance halls or theatres and cinemas fitted with sound apparatus. Films, concert and variety artists from Moscow, Leningrad, and Rostov tour the health resorts. Patients from neighbouring sanatoriums are invited in to each others' entertainments; tickets for the central spa theatre and concerts are distributed by the "culture worker." Games, dances, and excursions are organised. Sanatoriums have their libraries, and chess and billiards are played.

Sanatorium régimes vary but are not oppressive. Indeed it is the established policy to make the newly arrived patient aware of the possibilities rather than of the restrictions. In some sanatoriums children are admitted; in others—generally those belonging to organisations that have their children's sanatoriums—they are forbidden. Husbands or wives of patients can usually get a place if they apply in time, even though this practice is counter to the principle, mentioned above, of very careful selection of patients on medical grounds. There is a social factor in the selection too. The more valuable workers get preference over the less energetic, devoted, and responsible. It would be a false economy to separate husbands and wives who want to spend their leave together, and these valuable workers are worth generous treatment. A children's playground has been established in the centre of the park by the spa management. It is staffed by trained teachers and has provision for a hot midday meal and afternoon rest. Children can thus be taken off their parents' hands for a large part of the day. Medical examinations and treatments are by appointment, so that patients are spared waiting about. Generally they have baths and some other form of treatment on alternate days. Meals are served over two-hour periods. In the afternoons there is a two-hour rest period when patients should be either in their rooms or off the premises. In some sanatoriums there is

lights-out at 11.30; in others there is no fixed bed-time. On the whole the sanatoriums are quiet. The resident staff generally occupy separate buildings with their families, and the domestic staff live in the town. The wide, carpeted corridors and stairs and general large allowance of space per head seem conducive of tranquillity. Both spa and sanatorium directors and patients seemed puzzled when questioned about discipline, always replying: "But they are not children here; they know how to behave." There is a rule that a patient can be expelled for drunkenness, but it would only be enforced for persistent drunkenness and no one could quote a case of this. Alcoholic drinks are not served in the sanatoriums but can easily be obtained in the public restaurants and bars. The Caucasian wines are much appreciated and patients seemed to be drinking them in moderation, but very little drinking of spirits was to be observed. Smoking is allowed everywhere but in the dining-rooms, though of course both alcohol and tobacco may be forbidden to individual patients. There was very little evidence in either conversation or behaviour of patients disobeying doctors' orders. No one said: "Just this once, though of course I'm not supposed to. . . ." On the contrary, patients seemed very ready to coöperate with authority and extremely critical of any laxity.

The health resorts of the Soviet Union have been termed in official pronouncements "the repair shops of the workers." This may suggest a somewhat inhuman and mechanical treatment of patients, but actually the solicitude for them and the amount of individual attention that each one gets is remarkable. The idea is to overhaul the patient as thoroughly as possible in the three to nine weeks of his stay. The director of the Ministry of Agriculture's sanatorium pointed out the importance of the dentist's accessibility for his patients. "Agricultural workers generally live far from a dentist and neglect their teeth. We must see to their teeth while they are here, and educate them in oral hygiene too." Nearly every women patient is referred to the gynæcologist. Troubles hitherto unsuspected may be discovered by the day-to-day observation of patients at rest, and serious developments prevented. Patients are encouraged to complain of their minor ailments to the nurse or physician responsible for them, and treatment is modified as the patient requires. Most patients see their nurse every day. She must examine the spa booklet in which all treatment prescribed is entered and make the necessary arrangements for its performance. The resident doctors see their patients at least once in six days and on the patient's departure they check his booklet and enter in it necessary recommendations for the future. Patients seemed to be enjoying the care and consideration which they received. They talked very little of their ailments to each other and a great deal of their pleasure in their beautiful surroundings. By the end of their stay they are generally getting a little bored with comparative inactivity and are glad to leave, since they now feel better.

Kislovodsk is still in its infancy. Under the ten-year scheme of development the territory of both town and spa will be considerably enlarged. A town park and cultural centre will be established apart from the spa park, theatres, cinemas and concert halls, and open-air places of sport and entertainment. The existing sanatoriums are regarded as too close together: this gives a towny effect, whereas people should rest and recuperate in the country. The defect will be remedied by the removal of the old buildings and the utilisation of the space for gardens. In the future sanatoriums with a space allowance of 250 sq. m. per head (including garden space) is envisaged. Two more narzan springs have been discovered and will be brought into use, so that there will be enough water for 17,000 patients at a time to have narzan bath treatment. The number of patients passing through the spa every year will be increased to 200,000. Beautiful perspectives, magnificent public buildings and places of refreshment, green zones, swimming-pools and lakes, fountains, statuary, and all the appurtenances of pleasure grounds have been planned in detail, as well as the more prosaic matters of sanitation, transport, cold storage, and central heating. This comprehensive planning of amenities together with the systematic study of the application of the natural resources and the effects of treatment make Kislovodsk a health resort of exceptional interest and promise.

PARIS

(FROM OUR OWN CORRESPONDENT)

COMING REFORMS IN VENEREAL DISEASE LEGISLATION

M. Henri Sellier, Minister of Public Health, has just issued his draft of a Bill soon to be submitted to Parliament on the prophylaxis of the venereal diseases. This Bill has been awaited with much suspense in many quarters; the medical profession has dreaded further incursions into professional secrecy, and the proprietors of licensed brothels have taken genteel offence at the prospect of their activities being identified with the white slave traffic. It is evident, however, from a first scrutiny of this draft that M. Sellier has enjoyed the aid of diplomatists with a knowledge of human nature and of legal experts intimate with social and medical problems. If only half the good intentions expressed in this Bill materialise, a great step forward will have been taken towards the control of the venereal diseases. There are thirty articles in the Bill, but no attempt will be made here to summarise all of them. According to the first article, it will be incumbent on a doctor in attendance on a patient of either sex suffering from a venereal disease, which is contagious or liable to become so, to supplement his prescription with a notice drawing attention to the contagious nature of the disease in question and to the provisions of the new law. The second article is concerned with the conditions under which a doctor must notify to the public health authorities the case of a patient who is behaving so as to be a danger to others or himself. Later the conditions are defined under which communication of a venereal disease from one person to another is punishable by imprisonment or a fine; in an extreme case a term of five years of imprisonment may be inflicted. In another article the public health authorities are empowered to demand a medical certificate of any one about whom they have good reasons for suspecting that he or she is suffering from and transmitting to others some venereal disease. There follows a whole string of provisions calculated to prevent the transmission of syphilis in the act of wet-nursing, taking into account both alternatives—the infection of a healthy wet-nurse by a syphilitic infant and of a healthy infant by a syphilitic wet-nurse.

M. Sellier's Bill also provides for the continuity of specific treatment, the neglect of which by the

patient becomes a legal offence. He or she may choose between the treatment available at a dispensary or that of a doctor approved by the health authorities, but in either case the treatment chosen by the patient must be submitted to by him. Otherwise he or she risks forcible detention in a hospital, discharge from which may require the consent of the authorities. Infraction of this rule may qualify for a term in prison not exceeding three months. Up to three years of imprisonment may be earned by persons habitually debauching and corrupting persons of either sex under the age of 21, and even if the sufferer is over this age, certain penalties may be inflicted. No one may proceed to the fifth examination for the doctorate of medicine without presenting a certificate indicating that the holder has attended a course of instruction in the venereal diseases approved by the faculty of medicine; a certificate must also be produced stating that an examination referable to these special studies has been successfully passed. Other articles are concerned with remedies and tests. No remedy may be sold or employed in a public institution for the treatment of a venereal disease unless it is identical with what has been endorsed by the Ministry of Public Health on the recommendation of the Academy of Medicine. Only those laboratories approved of by the public health authorities will be considered as authorised to undertake the necessary serological tests for the diagnosis of syphilis. It is stated that when the new law comes into force, all the old administrative machinery concerning the sanitary regulation of prostitution will cease to exist.

A NEW MEDICAL SCHOOL BUILDING

The foundation-stone of the new buildings of the Paris faculty of medicine was laid on Dec. 3rd in the presence of a distinguished gathering representative of the municipal authorities, the University of Paris, and the medical profession. M. Jean Zay, Minister of National Education, presided, and among those present were Prof. Roussy, doyen of the faculty of medicine. The doyens of the four other faculties, as well as M. Charléty, rector of the University, were also present. The new buildings, which are to serve the education of medical students in the first two years of their training, are to be built on the site of the Charité Hospital in the very heart of Paris.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

ASCORBIC ACID IN URINE

AT a meeting of the Edinburgh Pathological Club a fortnight ago Drs. H. Scarborough and C. P. Stewart described their observations on the estimation of ascorbic acid in urine. They said that the amount of indophenol-reducing substances in normal urine is increased by boiling with acid in an inert atmosphere and by prolonged treatment with H_2S. Study of the rate of oxidation of these substances by atmospheric oxygen and of their regeneration by H_2S suggests that part at least is not ascorbic acid, though it behaves in a somewhat similar way. This suggestion is supported by the fact that only part of the indophenol-reducing power disappears rapidly when the urine is aerated in the presence of the specific hexoxidase recently studied by Hopkins and Morgan. The fact that part of the indophenol-reducing power does disappear rapidly under these conditions suggests that ascorbic acid is actually present. This conclusion, however, depends upon the absolute specificity of the enzyme, which is not yet fully established. The actual quantity of presumed ascorbic acid is greater than that determined by any of the direct titration methods. Part of it seems to be present in a combined form (hydrolysed by acid) and part in the dehydro form (reduced by H_2S). The non-ascorbic acid substance is not cysteine, glutathione, ergothionine, glycuronic acid, galacturonic acid, nor glucose.

MEDICINE AND THE LAW

Proof of Insanity in Criminal Cases

IN R. *v.* North the Court of Criminal Appeal was asked on Dec. 14th to say that a jury might infer insanity even though the defence had offered no specific evidence of it by means of medical or other witnesses. North had been keeping company with the deceased girl with her mother's consent. Last July the pair went out into the country together. Later, the same evening, North stopped a policeman who was bicycling along the road and showed him the fly-leaf of his bank-book on which was written a short account of the crime. He then took the policeman into a field and pointed out the girl's body lying in some long grass. Death was due to strangulation and there was evidence of a bruise on the chin. Defending counsel, though conceding that there was no medical evidence of insanity, invited the jury to look at the whole story and infer that North was mad at the time. Mr. Justice Goddard told the jury that there was no evidence on which a verdict of insanity could properly be founded and in effect directed them to disregard that defence. On appeal it was argued that neither in North's case nor in any case was a judge entitled to give the jury such a direction. The Court of Criminal Appeal, however, said that this step was properly within the province of the judge at trial.

Expert evidence of insanity is not indispensable; this point was established in R. *v.* Dart in 1878. But, if the defence of insanity is to succeed, proof must be given; the onus of proving it is on the accused. The issue is a question of fact which the jury must determine under the direction of the judge. Lord Hewart seized the opportunity in North's case to declare once more the three conditions which accused persons must satisfy if insanity is to be a good defence—the three "stiles" to be surmounted, as he called them in R. *v.* Anderson (the East Brighton golf-links murder). First it must be proved that, at the material time, the accused was suffering from disease of the mind—Stile Number One. Secondly it must be proved that, by reason of that disease of the mind, he was labouring under a defect of reason—Stile Number Two. Lastly comes a choice of stiles; the accused need not get over both of them, but he must get over one or the other. He must prove that, by reason of deficiency due to disease, he either did not know what he was doing, or, if he did know, he did not know that he was doing wrong. In North's case, said Lord Hewart, the task of the defence had never been so much as begun. It may be added that it is not the duty of the prosecution to tender evidence of a prisoner's insanity. This point was dealt with by the Court

of Criminal Appeal in R. *v.* Oliver Smith in 1910. It had arisen earlier over the practice of the Crown calling the prison doctor to prove the prisoner's state of mind. At a meeting of the judges it was decided that the Crown should not call evidence of insanity but that any evidence in the possession of the Crown should be placed at the disposal of defending counsel to be used by him if he thought fit.

Another Unsuccessful Appeal

On the same day the Court of Criminal Appeal rejected a similar appeal against a conviction for murder where death had been caused by strangling (R. *v.* Batty) and where insanity had been mentioned as a possible defence. Batty had gone on a half-day excursion with the dead girl and in some sort of quarrel he had taken her by the throat. Next morning he gave himself up to the police and took them to the field where the body lay. There was medical evidence that death occurred quickly and it was contended that there was no evidence that more than one hand had been used. The appellant's counsel argued that the trial judge had omitted to refer to these facts which might have justified a verdict of manslaughter instead of murder. Lord Hewart said it amounted to a suggestion that the judge had not adequately invited the jury's attention to fragments of the evidence indicating that the accused might not have known the exact length of time for which a person must be throttled in order to cause strangulation. There was, he said, nothing in this argument and the appeal must be dismissed.

Battersea Hospital Litigation

The headline "Hospital Staff Sensation" in a London daily newspaper this week was followed by statements that ten Harley-street and Wimpole-street specialists were applying for an interim injunction to restrain the Battersea General Hospital from dismissing them from its honorary staff. Recent changes in the name and objects of the Battersea General Hospital, eliminating the element of anti-vivisection, were discussed in THE LANCET a year ago (Nov. 30th, 1935, p. 1245). It was subsequently decided that all the appointments at the hospital should be thrown open to public competition. An independent body was asked to select a new staff from those who applied, and some of those members of the old staff who were not reappointed are contesting the legality of what has been done. No comment can be made on the situation without trespassing on matters which are now sub judice; but any proceedings which elucidate the legal position of the honorary members of hospital staffs will naturally be of interest to the medical profession.

PSYCHIATRIC DEMONSTRATIONS.—The senior medical staff of the Maudsley Hospital are coöperating with Dr. Desmond Curran in giving psychiatric demonstrations at St. George's Hospital to alternate with the neurological demonstrations held by Dr. Anthony Feiling at 5 P.M. on Thursdays. The following have been arranged for next term: Dr. Curran (Jan. 14th), Dr. Aubrey Lewis (Jan. 28th), Dr. W. H. Hubert (Feb. 11th), Dr. E. Guttmann (Feb. 25th), Prof. E. Mapother (March 11th), and Dr. Lewis (March 25th). Dr. Hubert will deal with the problems of child psychiatry, and the other lecturers with psychiatric problems of adult life. These demonstrations are not confined to students of the hospital, and further information may be had from the dean.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt. A. E. Flannery to be Surg. Lt.-Comdr.

Surg. Lts. (D) W. L. Mountain to *Royal Sovereign*; and H. C. Brewerton, R. D. Johnston, and G. P. Pearse to *Pembroke* for R.N.B.

A Greenwich Hospital pension of £50 a year has been awarded to Fleet Surg. C. S. Facey, M.B., retd., in the vacancy created by the death of Surg. Capt. P. E. Maitland, retd., on Dec. 1st.

Applications are invited for appointment to commissions as Dental Officers in the Royal Navy. Candidates, who must be below 28 years of age on the day of entry, must be British subjects of pure European descent.

Selected candidates will be entered for short service (six years) in the first instance, and on its termination they will receive a gratuity of £1000, unless granted a permanent commission.

Application forms, and a pamphlet showing regulations for entry and conditions of service, rates of pay, &c., may be obtained from the Medical Director-General of the Navy, Admiralty, S.W.1.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdr. C. H. A. Fido to *Drake* for R.N.B.

Surg. Lts. C. A. Mather and W. D. Williams promoted to Surg. Lt.-Comdrs.

Proby. Surg. Sub-Lt. L. Foster to be Surg. Sub-Lt.

ROYAL ARMY MEDICAL CORPS

The following appointment has been approved for the year 1937.

To be representative Colonel Commandant of the R.A.M.C.:—

Major-General W. H. S. Nickerson, V.C., C.B., C.M.G., M.B., Colonel Commandant, R.A.M.C.

Maj. A. L. Robertson, O.B.E., to be Lt.-Col.

Short Serv. Commissions: Lt. K. H. Foster resigns his commn.

Major E. F. W. Mackenzie, O.B.E., M.C., R.A.M.C., has been awarded the Parkes Memorial Prize 1936 for his investigations into the ammonia-chlorine process of water purification in the field, coupled with research carried out by him in connexion with food-supplies in India.

ROYAL AIR FORCE

Flight Lt. J. H. Cullinan is placed on the retired list at his own request.

Flight Lt. A. E. Vawser is removed from the Royal Air Force.

Flying Offrs. D. W. I. Thomas, R. F. Courtin, and D. J. Dawson to Princess Mary's R.A.F. Hospital, Halton; P. A. Lee to Home Aircraft Depôt, Henlow; A. R. Sibbald to No. 5 Flying Training School, Sealand; R. H. Pratt and E. W. R. Fairley to R.A.F. Hospital, Cranwell; J. Conroy to No. 7 Flying Training School, Peterborough; N. P. R. Clyde to No. 1 Flying Training School, Leuchars; and C. E. G. Wickham to R.A.F. Station, Manston.

DEATHS IN THE SERVICES

Lieut.-Col. JAMES TIDBURY, R.A.M.C. (retd.), who died on Dec. 22nd at Woking in his 85th year, was educated at University College, London, and Queen's College, Cork, and qualified M.D.R.U.I. in 1877. In the following year he joined the R.A.M.C., served with the Egyptian Expedition of 1882, being present at the battle of Tel-el-Kebir and receiving the medal with clasp and the bronze star. Retiring in 1898 he was re-employed from June, 1915, during the European War, and was awarded the O.B.E.

WE regret to learn of the death of Dr. Percy Vernon Davies, medical superintendent of the Kingston and District Hospital, which occurred on Christmas Day as the result of blood poisoning. Dr. Davies had been attached to the hospital for 25 years, being superintendent during most of the period. Owing to the situation of the institution many victims of motor accidents on the Kingston by-pass road came under his care.

CORRESPONDENCE

IN MEMORY OF JOHN BLAND-SUTTON

To the Editor of THE LANCET

SIR,—I desire to add my tribute to the memory of the great surgeon and remarkable man who has just passed away. My memories of Sir John Bland-Sutton extend back to 1891 when I entered the Middlesex Hospital medical school. Mr. Sutton, as he was then called, was the junior assistant surgeon and senior demonstrator of anatomy. He was a small, pale man with a dark moustache. Amongst us younger students he was chiefly known as a brilliant teacher of anatomy, but there was talk too of remarkable operative dexterity and courage. Our medical education had not then proceeded far enough to appreciate or even to know about the wealth of anatomical and pathological work which he had already accomplished. In those days a junior assistant surgeon had very little opportunity to distinguish himself in the operating theatre except during the holiday months, and it was not until he was appointed surgeon to Chelsea Hospital for Women in 1895 that Sutton got his chance.

It was on his advice that in 1898 I went to Chelsea as resident officer and by that time he was the "star turn" there. The surgical treatment of uterine fibroids was then in process of development against considerable opposition from certain quarters. Assisted by the late Arthur Giles, Sutton operated every Monday afternoon and the theatre was crowded with surgeons from all parts of the world. He had a remarkable power of infusing enthusiasm into those who served under him and all of us worked with a will to make the operations go off as perfectly as possible. It was the beginning of that "team work" which is now an established practice in all first-class surgical centres. In the face of his brilliant dexterity and successful results the opposition to the surgical treatment of fibroids rapidly died down and to him more than to any other surgeon in this country is due the credit of changing professional opinion in the matter of these tumours. But he did more than this, for he raised the status of abdomino-pelvic surgery out of the narrow rut of specialism in which it threatened to stick and created the gynæcological surgeon in place of the gynæcologist.

In appraising his place as a great operator it is necessary to have regard to the state of surgery at the time when he entered the calling. The new territory which Lister's discovery had opened to surgeons was being cautiously explored, antisepsis was still in the carbolic-spray stage, steam sterilisation was unknown, catgut was unsafe, silk, silkworm gut and silver wire were the popular ligature materials, the most advanced surgical attire was a carbolised mackintosh apron over ordinary clothes, and the idea of rubber gloves was nearly 20 years distant. Operating theatres were poorly equipped and a large proportion of surgical operations was carried out in the houses of the patients under very disadvantageous conditions. There was no system and very little coördination. As a result, surgery with very few exceptions was laborious, slow, and timid. Bland-Sutton perceived that for operative work to be reasonably safe under such conditions simplicity and speed were essential and his results justified his opinion. He reduced the number of instruments he used to the very minimum, six pairs of Spencer Wells forceps, a dissecting forceps, a pair of scissors, a scalpel, half a dozen needles and a couple of reels of silk thread sufficing him for any operation. He used antiseptic solutions very sparingly, especially on his own hands, maintaining, much in advance of his time, that they merely made the skin rough and more prone to harbour infection. There can be no doubt that at the outset of his career his views and practice as regards operating were largely influenced by Lawson Tait, of whom he always spoke with great respect. He was exceedingly quick and dexterous, yet light-handed as well, and his determinations were taken with unfailing rapidity and carried out with unfaltering resolution. To the last day of his surgical life tedious prolonged operations had no interest for him, and indeed he never entered upon them.

Only those old enough to know, or being too young can yet visualise the operating theatre of the 'eighties, can appreciate how much our Art is indebted to him. Since this present century began surgery has undergone a profound and advantageous elaboration, purchased however by the loss to the surgeon of some of that self-reliance which was so striking in Bland-Sutton at the operating table. The conditions under which surgeons now work mask this loss, but there are occasions still when the fate of the patient depends on this great quality alone and for that emergency every surgeon should keep within himself something of the spirit of Bland-Sutton.

I am, Sir, yours faithfully,

VICTOR BONNEY.

Harley-street, W., Dec. 21st, 1936.

To the Editor of THE LANCET

SIR,—Bland-Sutton was one of the few truly great men of the present century; he had innumerable interests outside his profession—travel, archæology, the drama, biology, &c. Everyone of course knows of his work on comparative anatomy, but he was also an excellent botanist, particularly interested in orchids and other plants whose life-history is associated with insect life. He was, moreover, kindness itself to all those with whom he came in contact, and was especially good to the younger men. Soon after I was qualified he asked me to prepare sections of all the interesting tumours which he removed or which were sent to him, and for ten years we met about once a fortnight to examine these microscopically. I used to look forward to these meetings because he would always think aloud while looking down the microscope, and recount in his own amusing way the chief points in the clinical history. He had a great power of carrying on the ordinary concerns of life while he was pondering something deeper and more important. It was because of this that his output of work was so enormous, although it was his custom to leave nothing, not even the most unimportant detail, to others. Although I must have received hundreds (perhaps thousands) of letters from him, I never received one that was not written, and the envelope directed, by his own hand. His letters were always exactly to the point, not a word too little and not a word too much.

But his true character may perhaps be best exemplified by an incident which occurred in my out-patient department a few years ago. A nun came to consult me and I asked her if she had been an in-patient in the hospital before. "Yes," she said, "I was under Saint John." I replied, "you

must surely mean Sir John." "Yes," she said, "I do," and she hastened to add, "but I could not have been more kindly treated had it been the saint himself."

I am, Sir, yours faithfully,

Dec. 22nd, 1936. SOMERVILLE HASTINGS.

To the Editor of THE LANCET

SIR,—I have reason to be grateful to Sir John Bland-Sutton not only for his stimulating friendship over a long period of years, but for his help in other ways. It was in my undergraduate days that Frederick Page told me about Bland-Sutton and recommended me to get his book on tumours. I had then read his little book on ligaments, which had opened up to us students a new world in anatomy. The book on tumours was at once arresting and fascinating and I never read a story with greater avidity. Bland-Sutton kept up a correspondence with Page about the treatment of the placenta in advanced cases of ectopic gestation and I remember the glee with which we looked forward to hearing what he had to say in this mild controversy. With the arrival of the *Clinical Journal* on Friday nights there was the eager anticipation of finding something from his facile pen. I shall never forget the warm reception he gave me when I first came to look round London in 1900. He invited me to see his work at Chelsea and to accompany him there in a victoria with a pair of beautiful greys. His conversation was like his writings except for the quips, difficult to reproduce in writing, which always conveyed some lesson. His London accent, of which I think he was a little proud, seemed to heighten the point of his remarks. He told me he had been born within the sound of Bow Bells, adding "Thank God, within easy reach of the green fields and the country."

Bland-Sutton's reverence for John Hunter was remarkable. I was once able to purchase three of Hunter's letters and, thinking that one of them would be of interest to him, I sent him a transcript. By return came a characteristic note in his clear legible hand telling me how much obliged he was for the chance of becoming familiar with the letter and adding, "When you come to town, be sure to bring it and show it to me, but *don't trust it to the post.*" Later I saw a good deal of his work at the Middlesex and each time there was something which impressed the visit on my mind. His technique, as has been said, perhaps lacked finesse and in the early days of the rubber gloves he treated them with a certain amount of levity, but he was skilful and adept in emergency and his results were remarkable. In other people's difficulties too he was a never-failing source of help, but his precision made his communications short. When the husband of an old patient wrote him a seven-page letter describing the symptoms from which his wife suffered and awaited in eager anticipation an equally lengthy reply, soon it came, but to this effect: "Dear Mr. ——, I am quite sure an operation ought to be performed. Yours sincerely,——" But it was enough. That night I reopened the abdomen; an uncertain illness was cleared up and recovery followed. His memory was remarkable, and although it astonished others he seemed to look upon it himself as the most ordinary thing.

I am, Sir, yours faithfully,

G. GREY TURNER.

Huntercombe Manor, near Taplow, Bucks, Dec. 22nd, 1936.

HOSPITAL AMALGAMATION IN LIVERPOOL

To the Editor of THE LANCET

SIR,—The Bill to amalgamate the four Liverpool general hospitals, in accordance with the report of the Liverpool Hospitals Commission, to which reference was made in an annotation on Dec. 19th (p. 1474), follows closely the provisions of the Birmingham United Hospitals Act, 1934. There are, however, several interesting differences in detail. In the Birmingham Act the distinction between the members of the honorary medical and surgical staffs and the resident medical officers was not so clear as in the Liverpool Bill. The Birmingham Act authorised accommodation to be provided for private patients in accordance with a scheme approved by the Charity Commissioners. The Liverpool Bill does not contain any reference to the Private Patients' Act of last session, and apparently its use will not be necessary especially as there is a clause authorising "any members of the honorary medical and surgical staffs of the Hospital to charge fees to paying patients to the Hospital." This raises the question whether the Liverpool United Hospital will have power to continue the present practice of allocating a percentage of the receipts from the Merseyside Hospitals Council to staff funds. It would seem to be desirable to place the matter beyond doubt by the inclusion of some reference such as that contained in the Prince of Wales's Hospital, Plymouth, Act.

The governing body at Liverpool will consist of fifty-one members as in Birmingham, with the difference that there will be two persons appointed by the University of Liverpool instead of only the dean of the faculty of medicine and two appointed by Merseyside Hospitals Council instead of three appointed by the two corresponding organisations in Birmingham.

The Liverpool Bill contains provisions in reference to the honorary staffs which are not contained in the Birmingham Act. Vacancies are to be filled by a committee consisting of the members of the Associated Voluntary Hospitals Board "other than any medical or surgical members whom the said Board may by resolution exclude together with such medical or surgical members as the said Board may by resolution co-opt and four persons two of whom shall be laymen and two of whom shall be members of the honorary medical or surgical staff of the Hospital appointed by the general committee." A layman appointed by the general committee "shall be entitled to preside and if necessary to give a casting vote." It seems to be an omission in the Bill that it makes no reference to the constitution of the Voluntary Hospitals Board. The Bill also gives a definite constitution to the medical board which consists of the honorary medical and surgical staffs, and "one person two persons and four persons respectively appointed" by the dental surgeons, pathologists, and anæsthetists. There is no provision for the representation of any other section of the medical staff such as obstetricians and gynæcologists or radiologists to whom it may hereafter be thought desirable to give separate recognition, though there is a power to coöpt within limits of particular offices set forth in a schedule. The medical board will have its own chairman and secretary. "No rule regulation or recommendation of the medical board shall have any force until the minutes of the meeting recording the same shall have been read to and confirmed by the general committee. . . . The medical board shall have the supervision of the

medical and surgical work of the Hospital and all matters relating to the purchase of surgical instruments and apparatus shall be referred to the medical board but that board shall not have power to purchase any instruments or apparatus without the previous sanction of the general committee." The medical board will have twelve representatives on the general committee.

The extent to which the provisions of the Birmingham Act have been followed in the Liverpool Bill shows that important precedents are being created so that the additional provisions relating to the medical staff incorporated in the latter deserve general attention, especially in places where the conditions are likely to render necessary similar legislation within the not distant future.

I am, Sir, yours faithfully,

C. E. A. BEDWELL.

King's College Hospital, S.E., Dec. 20th, 1936.

CARDIOVASCULAR EFFECTS OF BENZEDRINE

To the Editor of THE LANCET

SIR,—In a very interesting article in THE LANCET of Dec. 12th, 1936, Drs. Anderson and Scott describe cardiovascular effects induced by benzedrine in six patients out of a series of twenty. The patients selected were mild neurotics and psychotics, and it is stated a certain number of normal subjects were also investigated. It would be interesting to know what proportion of the series were normals, and if any of the normal individuals complained of pain in the chest, palpitations, or faintness. Case No. 6 had severe collapse eleven hours after the administration of 30 mg. of benzedrine. It is stated that an examination showed a 1–4 heart-block with an occasional extrasystole. Although nothing abnormal was detected in the cardiovascular system before the experiment, it would be interesting to know the result of an electrocardiogram taken after recovery from the attack, to see if any organic lesion of the heart was demonstrated.

The effect of benzedrine on normal persons has been investigated at this hospital on members of the resident medical staff. The series included eight individuals. On the first occasion four of them were given 30 mg. of benzedrine by mouth, and on a subsequent occasion the other four had 40 mg. each by mouth. The results after taking 40 mg. were little different from those seen after taking 30 mg. Blood-pressure and pulse-rate readings were made every half-hour sitting down. All cases showed a rise of blood pressure, which reached its maximum in 1½–2 hours, and had returned to normal after 4 hours. The systolic pressure rose from 20 to 30 mm. and the diastolic from 10 to 20 mm. The pulse-rate in the majority of cases showed a slight increase after ½ hour, but later was slowed in all individuals, and was slowest 1½–2 hours afterwards when the blood pressure was highest.

Although the rate was slow while sitting down it was very unstable, and the slightest exertion, such as getting up and walking around, caused great increase in rate. The first subjective symptom noted was a slight feeling of the head not being quite clear. Flushing of the face was experienced by some, and dryness of the mouth coming on after about one hour by nearly all. The only unpleasant feelings noted were by two individuals who on standing up had a transient feeling of faintness. In both the pulse-rate had suddenly increased to about 130. On sitting down the feeling quickly passed off and the pulse-rate in about ten minutes became again slower than normal.

The euphoria was well marked in all and after 1½ hours conversation was at a maximum. Many interesting and remarkable stories were told, mostly reminiscences of the past. All wished to talk and none to listen. The drug was taken at 8 P.M., and its effect on sleep was well demonstrated. The amount of sleep varied from 2–3 hours to none at all.

I am, Sir, yours faithfully,

J. H. FISHER,
Medical Registrar, General Hospital, Southend-on-Sea.

Dec. 22nd, 1936.

MORTGAGED PRACTICES

To the Editor of THE LANCET

SIR,—The letter from Mr. Carmichael in your issue of Dec. 19th, 1936, does not appear to us to be more than a statement that the scheme offered by his finance company is the cheapest and least onerous available to doctors, no matter what the circumstances of the particular applicant may be, or whether he requires the whole or only a part of the purchase price. Such an assertion, however, does not necessarily make it true in fact. We have been closely into all the various schemes in force and would make no such sweeping statement about any of them. The value given for money is often as important as, or more important than, the exact price paid; the cheapest is not always the best.

Plenty of doctors would rather not pay a gross rate of 6½ per cent. (with a return of the income-tax on the interest at the end of the year and a promise of a rebate of 1 per cent. in certain circumstances) when the loan can be secured elsewhere at a net rate of 3½ per cent. Plenty of doctors again might prefer a life policy which can be continued after the loan is repaid to one which provides decreasing cover and ceases when the loan is repaid, with the possible risk that health may prevent the doctor from securing life assurance which he is almost certain to need. There are many points which need considering, and true and impartial advice will seldom, if ever, take the form of recommending exactly the same scheme for everybody, no matter what his particular circumstances may be.

We are, Sir, yours faithfully,

LEE AND MARTIN LTD.

Birmingham, Dec. 24th, 1936.

THE FUTURE OF TEETH

To the Editor of THE LANCET

SIR,—Sir Norman Bennett's paper at the recent Public Health Congress is mainly an exposé of present conditions and a plea for the intensification of efforts to deal with a deplorable state of affairs. But there is no hope that way. The dental profession is trying to push back the ocean with a mop, and until the (political) engineer builds a good tariff wall against sugar and white flour, I fear that the blood and tears of children will continue to flow needlessly in our clinics.

Nearly 40 years' experience makes me think that dental disease is being neither treated nor prevented in the real meaning of those terms. For those who are in earnest about it my experience would suggest the following action. Abolish the beet-sugar subsidy and tax sugar like whisky, until sweets and toothache, like spirits and cirrhosis, become the luxuries of the rich. Prohibit the importation of white flour and start an unceasing propaganda for well-baked wholemeal bread having a legal maximum of water.

This by way of a start only. In five years' time we should know enough to look for other causes—if necessary. There is hope in these proposals but none whatever in the present futilities.

I am, Sir, yours faithfully,

Sheffield, 1, Dec. 23rd, 1936. H. J. MORRIS.

DEARER DRUGS

To the Editor of THE LANCET

SIR,—In his recent annual report the chief medical officer to the Ministry of Health commented upon the cost of medicines prescribed for insured persons, which in England worked out at 1*d.* per head more than in the previous year. Sir Arthur MacNalty inferred that the average expenditure per head for the country—namely, 3*s.* 1*d.*—was excessive. I do not think this inference is a fair one. Anyone who is in touch with the drug market will have noted the steady rise in the wholesale prices of drugs, particularly essential oils and other drugs of vegetable origin, which has been going on for a long time past and seems likely to continue. The cost of many commonly prescribed drugs is now far ahead of what used to be considered their normal value. This rise in drug prices is due to various causes, among them the Italo-Abyssinian war, the civil war in Spain, the prolonged drought in the United States, and the steady increase in the demand for vegetable drugs in most parts of the world, especially the United States of America. Let me mention a few drugs out of many which are now much dearer than they were—gentian root, ipecacuanha, ginger, rhubarb, euonymus bark, aloes, hydrastis, buchu leaves; while others such as saffron, ergot of rye, orris root, squill and gum tragacanth have been valued during the past year at figures from twice to six times as high as those of a year or two ago. Among essential oils, eucalyptus, star aniseed, clove, and lemon are much dearer than they were and the upward tendency continues. It seems likely too that the wide range of drugs grown in European countries and including such important articles as belladonna, henbane, aconite, and liquorice will continue to advance in price, partly owing to the policy of wholesale druggists in the U.S.A. in laying up larger reserves of European drugs as a precautionary measure in the event of supplies being cut off by war.

In view of these facts it seems clear that if the National Health Insurance drug bill is to be reduced drastic economies in prescribing will have to be practised to a degree which it is possible Sir Arthur MacNalty did not anticipate.

I am, Sir, yours faithfully,

London, Dec. 28th, 1936. F. C. GOODALL.

STANDARD OF ARMY RECRUITS

To the Editor of THE LANCET

SIR,—Your issue of Dec. 19th, 1936, records under Parliamentary Intelligence an account of a speech made in the House of Commons by Sir Arnold Wilson. He is there reported as criticising the rigidity of the medical examination of army recruits and as suggesting a civil inquiry into the working of the present system. I take this speech as an excuse for mentioning a problem which faces me, and I believe other civilian practitioners, from time to time, but not only in relation to the Army.

One is consulted by a patient who has applied to join the Army or some other branch of the Government or local service and who has been informed that his application must be refused unless he has an operation performed for an entirely symptomless varicocele. To perform an operation which the patient does not desire and which at the same time one would not conscientiously advise as being necessary for his health is a most humiliating professional experience; yet to refuse the operation is to debar the patient from joining the service for which he is applying.

My own experience and that of my colleagues whom I have consulted on this point is that a varicocele is a harmless anatomical condition; the text-books support this view. Are there any case records published of atrophy of the testis following a varicocele on which no operation has been performed? Is there any evidence that a condition harmless to a civilian citizen becomes pathological when he joins a police force? Is rejection of an applicant for Government or local service on account of a varicocele based on observation or on tradition?

I am, Sir, yours faithfully,

CECIL FLEMMING.

Upper Wimpole-street, W., Dec. 28th, 1936.

THE DISTRICT NURSE

To the Editor of THE LANCET

SIR,—In your leading article last week on district nursing you say that "it is likely that the Midwives Act of 1936 will further help the midwifery work undertaken by the Institute." As far as I can see the Act as administered by some of the local authorities is going to do a great deal of harm. In some places it almost seems that the county councils are so afraid that perchance general nursing may reap some advantage through the grants for midwifery that they are asking county nursing associations to enlarge their boundaries to such an extent that the midwife will spend most of her time travelling. The midwife's work is based on the number of births a midwife can attend, without due regard to the distances to be covered in sparsely inhabited districts or the nature of the country. Nursing associations were promised help for transport, but in one county at least where a transport grant is given the midwifery grant is so much the less. The reason given for this was that if a car was used more fees would be obtainable. If the transport grant is to be £25 towards the cost of running a car and the grant is to be docked of £25 in a mountainous country where there are few people and fewer births, where are the extra fees to come from to make up £25? Where in the past there has been a struggling district association in existence, supported by voluntary effort and always on the verge of bankruptcy, the powers that be may assess the district at a quarter of a midwife. The association will then get even smaller grants than formerly and will be obliged to raise their nurse's salary and pay for a pension scheme, uniform allowance, and telephones. What the local associations are asking their county offices is: How is it to be done? On making representations to our local authority we are told that they would prefer to take over the whole service themselves. Then what is to happen to the general cases, the pneumonias, the old people, and the dying? Surely these also matter as well as the babies? But there is not enough work or money to run a general nurse as well as a midwife in most rural districts.

I am, Sir, yours faithfully,

HON. SEC. OF A COUNTY NURSING ASSOCIATION.

Dec. 28th, 1936.

GRAINS AND SCRUPLES

To the Editor of THE LANCET

SIR,—Allow a reader of THE LANCET for sixty years a few words in appreciation of the series entitled Grains and Scruples. The articles have almost without exception given me great pleasure and if here and there I am moved to criticism I can take this step freely since if I tread on any toes, at present at any rate, I cannot know on whose toes I am treading. Anonymity gives the opportunity for criticism which some well-known name might prevent.

I was prepared to find that the consulting physician and surgeon and the specialist, generally practised writers, could certainly inform and probably entertain me. That other types of medical man could do so equally has come as a revelation. None of the writers has, I think, surpassed the country practitioner in the quality of his contribution, though personally I have found "A Chronicler" the most interesting, and he has set me wondering about the changing relationship of our medical press to the lay newspapers. The latter busy themselves a good deal to-day, as "A Chronicler" points out, with medical subjects. To what extent, if any, are medical papers likely to retaliate? Is there any chance that, seeing the intense interest which medical news appears to have for the non-medical reader, medical papers will seek an increased circulation by making their columns more easily understood by those who have had no medical training? Already a certain, though probably quite a small, proportion of these people do actually look at *The Lancet*, or *British Medical Journal*, or both every week. At clubs many may be observed scanning their pages, and later they button-hole any fellow member who chances to be a medical man and seek explanation. As a matter of fact these readers do not find much that they cannot understand without help.

There is a notable decrease in the publication of articles with a medical name attached which a year or two ago flooded certain daily newspapers. A violent effort had been made from certain quarters to overthrow the commonly accepted attitude of our profession regarding publication in lay papers over the writer's name. The effort has failed—and a good thing too. Sir, I wax garrulous as an old man will, and I must bring my letter to an end by saying I look forward to reading many more of the series Grains and Scruples.—I am, Sir, yours faithfully,

Dec. 24th, 1936. SENEX.

OBITUARY

ALFRED GREENWOOD, M.D., B.Sc. Manch., D.P.H.

Dr. Alfred Greenwood, who died at Maidstone on Dec. 4th, had not long retired from his position as chief health officer for the county of Kent. Born at Sheffield in 1873, the son of the Rev. E. Greenwood, he was brought up at Southport, educated at the Wakefield Grammar School and Owen's College, Manchester, qualifying in medicine at Victoria University and taking the triple Scottish qualification, both in the same year, 1895. After qualifying he held a remarkable series of resident posts in or near Manchester, including surgical, medical, and poor-law experience as well as residence in a famous children's hospital. Five years after qualifying he entered the public health service, first at Blackburn and then at Crewe, until in 1913 he was appointed to the county of Kent when the late W. J. Howarth was transferred from Kent to the City of London. Dr. Greenwood was also school medical officer and chief tuberculosis officer. He organised the county schemes for the prevention and treatment of venereal diseases, for maternity and child welfare, and the treatment of crippled children, and completed the arrangements for tuberculosis started by his predecessor. He was successful in correlating the voluntary work in the hopfields and in supervising the hopper encampments. In the summer he arranged a very popular post certificate course for the midwives practising in the county. He was keenly interested in cancer research, serving on the council of the British Empire Cancer Campaign and acting for a time as chairman of its local executive. In 1925 he was one of two representatives nominated by the Ministry of Health to visit Jugoslavia in order to study public health on behalf of the Health Section of the League of Nations. Dr. Greenwood held rank as Lieut.-Colonel R.A.M.C. (T.F.). He was mobilised on the outbreak of war in 1914 serving in succession as divisional sanitary officer, sanitary officer of the Second Army central force, and sanitary officer of the Southern Army. He will be remembered as a conscientious public servant with a real talent for detail.

PERCY A. E. RICHARDS, F.I.C., F.C.S.

THE death occurred on Dec. 22nd of Percy Andrew Ellis Richards, a well-known analytical chemist, and past president of the Society of Public Analysts. Born in London in 1868, son of Robert Phelps Richards, he was educated at St. Paul's School and King's College, London, and later studied chemistry under the late Prof. Heaton, with whom he worked, in particular as an assistant at the Charing Cross Hospital. There his colleague and contemporary was the late Archibald Vasey, for many years superintendent of THE LANCET laboratory when the analyses of foodstuffs and pharmaceutical preparations, for which we made ourselves responsible, were done on the premises. Richards succeeded Heaton in his post at Charing Cross Hospital, where he lectured on pharmacy and analytical chemistry in the medical school. As a result he published a guide to the examination in practical chemistry of the English Conjoint Board, in which a well-prepared and accurate system of procedure was laid down for the guidance of the students in making ordinary chemical preparations. He was appointed public analyst to the parish of St. Martin-in-the-Fields, and shortly afterwards to the same post for the borough of Hammersmith, and lastly for the City of Westminster. He was a member of the council and examiner at the Institute of Chemistry, and as the outcome of much teaching experience he wrote a work on practical chemistry of a larger scope than his previous treatise. But he made no attempt here to go beyond the limit of the examinations in preliminary subjects at the University of London, and the book was a sound introduction to elementary methods of qualitative and quantitative analysis. He contributed frequently to medical literature, as well as to the *Chemical News* and the *Analyst*, while his connexion with Vasey led often to joint work being conducted in THE LANCET laboratory, the outcome being the publication in these columns of pharmaceutical notes.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

FROM A PUBLIC HEALTH CLINICIAN

I

Of all hobbies natural history best befits the training and daily life of a doctor. And of all branches of natural history ornithology is the best suited. Observation in this field must be swift and accurate; with use it becomes more detailed. And there is nothing more helpful to our daily work than the power of swift, accurate, and detailed observation. It is not enough to note the passage of a large or small bird with bright or sombre plumage, we must note the details of the colouring, the colour of wings, legs, and rump. There are also other points such as the manner of perching and the mode of flight or the habits of feeding. The habits and idiosyncrasies even of common species provide a constant field of changing interest and training. It is not only the eye that is trained but equally the ear. The recognition of special notes and songs makes the whole countryside seem more friendly and however long we may have been watching or listening, each day may produce some new sound or display some unfamiliar feature.

* * *

The drawback to a prolonged study of ornithology is the limited number of British birds, so that, after a few years, the thrills of new discoveries become fewer; but there is always the excitement of seeing some new antic and it is here that other branches of natural history may fill the gaps. The observer may turn to entomology or to the more leisurely contemplation of botanical, mycological, or bryological finds. Fortunately no doctor who has to earn a living will ever become a really expert ornithologist, or indeed expert in any branch of natural history; he must remain a dilettante naturalist. The more dilettante the student the more relaxation is he likely to achieve; discoveries which to the expert would be mere dross are to him golden. A lifetime can be spent learning in this domain and much will still remain undisclosed or undiscovered. Medicine, in the broadest sense, is similar: for forty years we may continue observing and note-taking, yet the very next day we may detect a clinical entity, or a syndrome, which we have never before noticed, read about, or even heard tell of.

* * *

Accuracy of observation by ear or eye is a comparatively rare gift, and experience of the examination of girl guides and boy scouts tends to confirm this impression. How often one reads in their reports that the birds "sang sweetly" or that the observer saw "several beautiful birds"; how seldom is an attempt made to describe correctly the sounds heard or to give the exact plumage of any one bird, even of a robin or house sparrow. Small blame to the scouts, for they are novates and we doctors are trained observers, yet when stories of cases are narrated to us by colleagues we hear of "influenza," "rheumatism," or "neuritis" when what would interest us more would be the exact symptoms of which the patient complained in chronological order and in plain English.

Plain English of course may have its limitations, and taste in the selection of words is a little uncertain. One doctor always employs the word "belly" when speaking or writing of what we usually call the abdomen. "She had a pain in the belly," says he, or perhaps, "Two days later I opened the belly," or again, when questioning a patient, he may ask, "have you had any pain or discomfort in the belly?" He does it so nicely, and with such a gentle and cultured air, that I am almost persuaded that the word should be more freely used, and that it is more apt when speaking to a patient than "stomach" or "tummy"; but there prejudice, whether inborn or acquired, steps in. I fall and find myself preferring instinctively "abdomen" or "stomach."

* * *

Those who manufacture chemicals and other articles of commerce deluge us with samples of their wares, and it is difficult to decide how best to utilise or dispose of these. Put them in a cupboard to await an appropriate patient, there they are discovered dusty, desiccated, or mildewed some twenty years later; dispense them to a patient and the result may be disappointing or on the other hand more and more may be asked for; our samples become exhausted and we have to buy further supplies at exorbitant prices of something in which we perhaps have little faith. If we decide to take them ourselves we may have to wait long for the right illness; or a false parsimony may induce us to take them without delay and so maybe spoil the digestion of an otherwise enjoyable dinner.

* * *

It is fortunate that I have made the acquaintance of a Scottish spinster of uncertain age who enjoys swallowing any and every sample that I am prepared to hand over. Lactic acid bacilli in legion have found their way to her and scores of aperients dispensed as liquid, pills, or powder. Tonics too please her, and many familiar green bottles have passed that way as well as cough syrups and the like. Highly or less highly concentrated hormones and vitamins delight her, be they from corn husk, testis, ovary, or pituitary. But best of all did she like a small yellow bottle of concentrated vitamins, or hormones, and so great was her affection for this tonic that she wished to obtain it privately. The chemist offered to supply it at 10*s.* 6*d.* a bottle; this did not please her. I wrote the firm, and they would let me have it at a professional price of 6*s.* 6*d.*; that still did not appeal to her. Then I read the bottle and noticed that the specimen contained 20 per cent. of alcohol and explained to her that it was that ingredient, perhaps, which made the remedy agreeable. If she spent her money, I suggested, on cooking sherry, or even upon beer, her outlay would be better repaid. I cannot yet say whether my advice was taken.

Fortunately some years have passed since we ceased to receive packets of handkerchiefs or fountain pens for purchase or return. Handkerchiefs were bought and the price was not unreasonable, but a fountain pen I once retained without payment to see what happened. After a series of letters, which remained unanswered, the pen stayed with me, to be rediscovered many years later. I

could not make it serve the purpose which its designer had intended, and so after all it died unused. Perhaps similar pens shared a similar fate, and so this method of salesmanship became unprofitable.

* * *

Students are led to believe that the general practitioner is a dangerous necessity, seldom other than ignorant and incompetent. In practice later, on the other hand, we are told, when consultants address us, that we are the backbone of the profession, up to date, eager, wise, and conscientious. It would be serious for our moral welfare if we did not encounter occasional fractious patients who frankly criticise our methods. Most of us would acknowledge on reflection that the majority of doctors of consultant rank are more intelligent and better informed than the majority of general practitioners. The chief mental difficulty of the general practitioner is isolation. He is conversing with and treating those who know nothing about medicine and who accept his dicta and explanations almost without question. Gradually the isolated doctor, and in this respect he may be as much isolated in town as country, becomes to believe fervently in himself and in his own dicta, and observation of one or two lucky cases may lead him to believe that his therapeutic methods are superior to those of others. The conceit occasionally revealed by such doctors is surprising; yet such a doctor may not be useless to the community. A man who believes sincerely in his own powers and his own remedies will have a better and more useful influence over his patients than one who is diffident and hesitant.

* * *

The remedy for isolation is within reach of everyone; it is to attend meetings, encounter others, and exchange views. These opportunities are provided by local medical societies and the B.M.A. But there will always be a large number who never attend meetings and who deteriorate unconsciously but continuously. The best doctors in any locality are those who attend meetings. The most dangerous period is the beginning; once the habit of meetings and post-graduate study is formed all goes well, but these habits should be cultivated in the first year of practice or it may be too late.

* * *

It is curious how often doctors continue to believe in, and to practise, methods which were foremost in their student days but which have now been largely abandoned. It is almost possible to date a man by his methods. There will be the vaccine fan turned out in the opsonin days; the country surgeon of a little later date who fixes the abdominal viscera; the man who circumcises all the babies, or blocks up sinuses with gauze, or the one who has one or other special drug for curing pneumonia. Yet all these happenings increase the varied interest which medical practice and life provide.

PARLIAMENTARY INTELLIGENCE

INSANITY AND DIVORCE

BEFORE the House of Commons rose the Marriage Bill was further considered by Standing Committee A, when Lieut.-Commander AGNEW moved an amendment to delete the paragraph which provides that incurable insanity after the respondent has been certified a lunatic for at least five years shall form a ground for divorce. He said that the proposals of the promoters of the Bill differed very widely from the recommendations of the majority report of the Royal Commission of 1912. The Mental Deficiency Act of 1930 might have altered the situation, but through the majority report very great power resided in the Lunacy Commissioners. He regarded the proposals of the Bill as a weakening of that position, and the essential safeguards which the Commission sought to recommend would be entirely lacking. Before a petitioner could go to the court under the five-years rule and sue for a divorce, the spouse might leave the mental hospital from time to time and there was nothing in the Bill to stop what they all wanted to avoid, the the procreation of children who themselves might be mentally afflicted. This social evil would therefore go on exactly as before. Were those that might subsequently recover their sanity to come out and find that a new marriage had been contracted? The very knowledge that this might occur would have a detrimental effect on their recovery while they were in the asylum. He thought it would be wiser to keep the insanity in the same position as total bodily paralysis or epilepsy, grave calamities that deprived one partner of all that marriage meant.—Mr. HERBERT, who was in charge of the Bill, replied that the promoters of the Bill intended that proceedings should be served on the King's Proctor, who should refer to the Board of Control. They were now inserting a new ground for divorce, and the present feeling was that the subsidiary effects and results could be dealt with under Rules of Court which had to be laid before Parliament so that control would be effective.

Sir ARNOLD WILSON, who opposed the amendment, said that there were something like 50,000 married persons of unsound mind who were now in institutions in this country and the majority had been there for more than five years. Since the Royal Commission sat in 1912 one of the aspects of insanity that had been best established was that as a rule it was not a catastrophic accident comparatively late in life; it was more often inherent, usually coming out long after the marriage took place. There was not much ground for believing that there had been any very serious eugenic consequences from the liberation of persons during temporary periods of sanity.

Mr. LYONS asked why they should take only one kind of disease—disease of the mind—and use that as a ground of divorce? The proposal required the very gravest scrutiny. He believed that public opinion was in favour of maintaining the obligation of the marriage tie and not of whittling it away at the will of some new statute designer. Such experiments were fraught with danger.—Mr. RAIKES said that if there were to be any extended grounds for divorce at all insanity had a stronger case than anything else. There were thousands of people who had been driven by the present laws into irregular unions.

Mr. G. GRIFFITHS said that there had been more working-class married women pronounced insane since 1926 than ever before. That was because of the domestic difficulties from not having the money to carry on the home. If a working man's wife was sent to an institution this Bill might be taken advantage of to obtain a divorce after she had been there 5 years. She might come out completely cured and find that her husband had remarried. He suggested that the period should be increased from 5 to 10 years.

This amendment was defeated by 16 votes to 5.

Sir A. WILSON moved an amendment, first, to substitute for the word "insane" the words "of unsound mind," in order to bring the Bill into line with the wording of the Mental Treatment Act, 1930.

Secondly, the amendment substituted for the words "has been continuously a certified lunatic" the words "has been continuously under care and treatment." The former words were found to be too narrow because they excluded a criminal lunatic, but included members of the fighting forces who could in certain circumstances be detained without a statutory certification. The Bill did not provide for the important cases of persons certified and detained in an institution under a reception order and kept as a voluntary patient after the expiration of the order. That class included one in four of all the persons admitted into institutions last year. They were none the less of unsound mind because they were admitted as voluntary patients and not under compulsory certification. From the point of view of administration and psychology it was of the greatest importance that they should not do anything to discourage voluntary patients. The mere knowledge that under the Act of 1930 the voluntary patient had the right on giving notice to leave probably did more towards bringing about a cure, if a cure could be effected, than any other single thing. The word "incurably" remained and the Court would have to be satisfied by the highest medical authorities that the patient was in fact incurable.

This amendment was agreed to.

UNEMPLOYMENT ASSISTANCE

Just before the recess Mr. GEORGE HALL moved the suspension of the Unemployment Assistance (Determination of Need) Regulations in so far as they involved reductions in existing allowances. The Labour Party, he said, had not in any way withdrawn their hostility to the regulations as a whole and especially to the means test. They wished the Government would consider the wider social and economic cost of the paralysed and wretched groups of communities now suffering in South Wales, in the North, and in Scotland, and remember that they were a very heavy off-set to the seeming prosperity of the industrial Midlands, London, and the South. Application of the new regulations would not only drive the unemployed still further into the depths of starvation, but would impose new cuts on the already low wages of the employed workers, would further destroy family life, would so reduce the purchasing power of the people that small traders and shopkeepers would be driven into bankruptcy, and the already difficult task of the local authorities in those areas would be made impossible. In Mountain Ash, for instance, between 40 and 45 per cent. of the insured persons had been unemployed, and 80 per cent. of the men had come under the operation of the Unemployment Assistance Board. In the whole of Glamorgan county they had discovered 9800 children between the ages of 5 and 14 who needed clothes and 13,000 who needed boots. But in the memorandum issued by the Board it was stated that reductions in allowances would be necessary. Within the next few months some 60,000 persons would suffer reductions.

Mr. BOOTHBY said he did not believe the agitation in the country about nutrition was a mere stunt. There was a tremendous lot behind it. They had the authority of medical and scientific opinion which was beyond reproach that about 20 per cent. of the population were under-nourished at the present time, and if proof was required they found it in the figures of rejections for recruiting, particularly in the West of Scotland. Children and nursing mothers in the distressed areas were not at the present moment adequately nourished and the cost of that on the national disease bill was very great. He wondered how much of the £20,000,000 spent on disease alone in Scotland was due to the fact that in their childhood so many of the young men and women were under-nourished and badly fed. There was no doubt that a blow was going to fall on some of the unemployed and mainly in the most distressed areas. The Government had been asked to introduce legislation to deal with this particular problem and the Chancellor of the Exchequer had promised to do so next May. But in the very nature of things that must be long-term legislation. Nothing effective could be done for the distressed areas for another year at least—it might be much longer. The motion before the House asked that during that unstated period there should be no further penalties imposed. That was a reasonable request. What was the point from the national point of view of reducing the purchasing power of the people in the distressed areas by a single penny?

THE LABOUR MINISTER'S REPLY

Mr. ERNEST BROWN said that the new regulations came into force on Nov. 16th and the process of reviewing cases was nearing completion. Large numbers of persons had received notices that their allowances would be increased while no applicant had received a notice that his allowance would be decreased as a result of the new regulations. These regulations, as the motion really admitted by implication, were a considerable improvement on the old ones. Their effect would be to remove some of the inconsistencies of unequal treatment which obtained under the standstill arrangement. On the basis of a review of 612,000 cases they had found that they were likely to have more than one-third of the cases receiving increases. Where reductions fell to be made because excess payments not needed were being made the reductions would be made gradually in order to avoid hardship. If a man's earnings were less than 25*s*. there would be no reduction from his standstill allowance. If his earnings were between 25*s*. and 60*s*. there would be deducted only the amount by which his earnings exceeded twice the amount of his allowance. He thought this was a fair rule. The Board had told the advisory committees that all households in which more than half of the resources consisted of some form of income other than earnings should be excluded altogether as also would be households where the principal resources consisted of the earnings of sisters of the applicant or a married son, or of a more distant relative. Applicants with earning brothers and sisters would be included only if their fathers were earning substantial wages. The Board had suggested to the advisory committees that in the class of case to be affected the payment made should not exceed by more than 15*s*. or 20*s*. the amount of the applicant's needs as calculated on the new standard. The careful and detailed analysis laid before the House in July seemed to show that the hardships felt under the old regulations had been removed.

The motion was negatived by 218 votes to 135.

PIT-HEAD BATHS

In the House of Commons on Dec. 16th, Mr. GALLACHER moved:

> That this House, in view of the advance that is taking place in housing, in health, and in hygiene, is of opinion that pit-head baths have become an urgent necessity for all mining communities and, recognising the limited resources of the Miners' Welfare Committee and its inability under present conditions to cope with the demands being made upon it, expresses the opinion that the Department of Mines should immediately institute an inquiry on the best method of amplifying the finances at the disposal of the Committee and thereby ensure that pit-head baths will be established as a recognised part of the equipment of the mines of this country.

He said he appealed on behalf of the wives and mothers in miners' homes for the immediate installation of pit baths at every working pit in the country. Though the various departments of the State were now doing a great deal to try to cope with infantile mortality and children's diseases, they had very much further to go, and here right before them there was a danger facing the children that they could immediately remove. A young child might be affected by one of the epidemics common to children, and the father was forced by the exigencies of the situation to carry into his home coal dust and gases; his damp, sodden clothes had to be hung up to dry. The Royal Commission on Housing in Scotland referring

to such conditions in miners' homes had said "The risk to the health of the children is very great." No time should be lost in saving the children from this menace. But the miners themselves ought also to be protected. They came up from the pits soaking, and then they had to travel home in their soaked clothes for miles. It was an intolerable position in which to place any man. From 1920 to 1926 only £121,463 had been allocated for baths out of a total of £4,500,000. The 1926 Act imposed upon the Central Committee the specific duty of providing pit-head baths at all coal mines, as far as reasonably practicable, and required that the proceeds of the royalty levy should be used for that purpose. The 1934 Act laid it down that a sum should be added to the fund that came from the royalty levy providing a total of £375,000 annually for installing baths. That was the fund that the Welfare Committee now had at their disposal for baths. The Committee, he believed, were working as energetically as possible within the limits of their means. But the Committee originally had the whole of the funds, four-fifths going out to the districts and one-fifth being retained for general purposes connected with welfare. Then £375,000 was taken away from the general fund for baths, which meant that the fund for welfare had become much less. All the time the administrative expenses and the staff were increasing. This situation brought all kinds of criticism against the Committee which they did not deserve. He urged that the control of the installation of baths should be placed in charge of the Mines Department. The Government should make an interest-free loan equivalent to 10 years' income of the fund.

Mr. WATSON, seconding the motion, said that where baths were provided they were told that 90 per cent. of the men were willing and anxious to use them. He hoped that the motion would be carried unanimously and that they would find the Government sympathetic.

Mr. LEWIS JONES moved the following amendment:

That this House, while appreciating the great advantages to the mining community resulting from the provision of pit-head baths, is of opinion that the report of the Departmental Committee of Inquiry which resulted in special provision for the financing of pit-head bath construction by the Mining Industry (Welfare Fund) Act, 1934, provides the House with full and sufficient information on this important subject.

He said that he appreciated the need for more baths, but he was satisfied that the Welfare Committee were making reasonable progress in providing them, and the district committees were showing increased interest in the movement. The continued increase in output in 1935 and 1936 justified the expectation of substantial increases in the income of the Welfare Committee. With the complete information available in the Departmental Committee's report, with the annual report of the Welfare Committee, and with the improved financial position of the coal industry generally, he suggested that the work of the Welfare Committee should be allowed to proceed without further interruption.—Mr. ROWLANDS seconded the amendment. He submitted that no case had been made out for demanding an inquiry on this question because all the information necessary was at the disposal of the Ministry at the present time.

Captain CROOKSHANK, Secretary for Mines, said that he had no statutory responsibility for enforcing anything, and the whole question of pit-head baths was one for the Welfare Committee to deal with, and he was sure that they would appreciate what had been said in the House that afternoon. It was not a shortage of money that was holding up any programmes. The Committee had come to the conclusion that it would be possible to speed up to the extent of expenditure from £375,000 a year to the rate of £600,000 for each of the next two years. In addition to 182 baths opened, 34 being built and 25 tendered for by the end of this year, there would be by the end of 1938 about 40 further baths for which negotiations had already been started and some 55 negotiations for which had not been started, but of which the general idea had been adopted. This would bring the total by the end of 1938 up to 336 baths with accommodation for some 425,000 persons. That envisaged considerable acceleration, and since the expenditure concerned ran into rather big figures, that was about the maximum speed possible, but it was not shortage of money that was holding up the programme.

After further debate Mr. GALLACHER asked if the Minister was prepared to give an undertaking that he would consult with the Welfare Committee and with them work out a scheme covering all the applications now before the Committee so that each of the pits would have some idea whether or when they were likely to have an installation.

Captain CROOKSHANK replied that he was certainly prepared at all times to consult the Welfare Committee. The amendment was withdrawn and the motion agreed to.

DISTRESS IN THE HIGHLANDS AND ISLANDS OF SCOTLAND

Mr. R. GIBSON moved that the House should call upon the Government to formulate without delay proposals designed to arrest depopulation and poverty among the remaining inhabitants of the Highlands and Islands of Scotland and to provide them with facilities for earning a decent livelihood.

He said that the distress in these areas and the pressing need for remedial measures were keenly felt not only there but wherever descendents of Highlanders lived.

After further debate Mr. ELLIOT, Secretary of State for Scotland, replying to the debate said that great efforts had been made by the Central Government to deal with this problem. In 1935–36 over £1,500,000 had been paid to the Highlands and Islands by Government grants and there was a further £1,400,000 being spent on pensions and unemployment payments. The Highlands and Islands medical service, which was a striking success, involved the expenditure of considerable sums and also the maintenance of a very much higher standard of medical service than the area could afford for itself. Though there were still considerable distances over which sick persons had to be brought, that those distances were being shortened each year, that the hospital services were being improved, and that new hospitals were being built. Grants were now being approved of over £50,000 for additional general hospitals in Shetland, Lewis, and Orkney, and grants had been made to places like Inverness Infirmary to bring it up to the standard of a full general hospital. After referring to the considerable grants made to the Highlands and Islands in respect of roads, education, and housing, he said that when they spoke of distress and the danger of the collapse of the future welfare of a whole community they must be careful not to form an exaggerated view of the situation. It would be a great disservice to the Highlands themselves if they did so. It was well worth noting that the vital statistics of the Highlands were very much better than those of Scotland as a whole. The adjusted death-rate in the Highlands was only about four-fifths of that for Scotland. The sickness-rate among the insured population was also less, being only 70 per cent. of the whole country, and the infant mortality was 32 per cent. lower. These were not the signs of a dying and decaying race, but of one that had undergone and was undergoing hardships and required that its lot should be improved; but they did no service to either the Highlands or to their inhabitants to depict them in a scheme of unrelieved blackness and gloom.—Mr. JOHNSTON: What about the tuberculosis figures? Mr. ELLIOT said he had not got those figures with him but the right hon. gentleman would know that the Highland population was susceptible to tuberculosis. It was not so much in the Highlands themselves as when the inhabitants migrated to the crowded cities that the rate went up.

The motion was agreed to.

PUBLIC HEALTH

THE HEALTH OF THE SCHOOL-CHILD

THE annual report of the chief medical officer of the Board of Education is the product of the whole school medical service, condensed and edited by the medical staff at Whitehall, with Sir Arthur MacNalty as the final censor. The school medical reports, which go back to 1909, show the evolution of the school medical service; although that of 1935 is obviously the successor of that of 1934, it is widely different in character from the reports of twenty, or even ten, years ago.

ROUTINE INSPECTION

The most notable feature of the present report is Chapter III which, though it bears the title of "Routine Medical Inspection," is really a reply to criticisms of the service made by Dr. H. L. Cronk, Dr. H. Herd, Dr. G. A. Auden, and others, and to a lively discussion at the R.S.I. conference at Bournemouth. It is unusual in an official report to find an apology for a government scheme against outside criticism, but the constructive nature of the Bournemouth suggestions called for consideration and we much appreciate that this should be given them in the report of the chief medical officer. It was not proposed at Bournemouth that periodical routine examinations should be abolished, but that there should be greater liberty allowed to modify them by those school medical officers who are admittedly specialists in this sphere of medical work. The answer of the Board is that it sees no reason at present to modify the requirement of periodical inspections, but the tone of the chapter in Sir Arthur MacNalty's report leaves the impression that the Board is prepared to modify the schedule if adequate argument is forthcoming for doing so. It has been pointed out that, though school medical officers of the experience of Drs. Auden and Herd might well be given freedom, the majority of school medical officers are juniors who could not be expected to work an adaptable scheme of inspection without the schedule and precise instructions from headquarters. Apart from its insistence on the three periodical routine inspections, the Board does allow wide latitude in the conduct of school medicine and, following the practice of the Ministry of Health, connives at much it does not actually sanction, if it is convinced that it is of public benefit.

NUTRITION

To the public and to doctors not specialising in school medicine the most interesting chapter of the report is that dealing with nutrition, for 1935 was the first year in which the social research in feeding, which has been such a prominent feature of the present decade, could be put to practical test in the experiment of the milk-in-schools scheme. Nutrition of school-children is now assessed in four categories —excellent, normal, slightly subnormal, and bad. The groups are undefined and there is some, but not much, variation in individual ideas of what the headings mean; but they are the least confusing available at present and leave open the field for experimental tests of nutrition. Children are taller and heavier to-day than they were formerly. This is a universal finding. It is not necessarily all due to improved nutrition, but there is no doubt that the nutrition of our children has improved, for all the special tests used show an upward trend. So far as we can see at present, the milk-in-schools appears to do what was expected of it, but has not done all that it can do, from a "misunderstanding" for which the Board itself is partly, but perhaps unavoidably, responsible. A considerable number of children for whom the milk is necessary fail to get it because they fall between those who can afford to pay for it and those who obtain it free. "A small group whose parents professed that they were unable to pay and who were not found subnormal by the doctor" exists because the Board laid down restrictions on the supply of free milk. Some authorities relentlessly follow the Board's instructions, others practically ignore them; generally they are lapsing, for there is agreement amongst all political parties that there should be no risk of under-nourishment of children which could be relieved by the supply of milk at the public expense. Economically the provision is so cheap, and malnutrition so dear, that the restrictions cost more than the milk. Severe malnutrition is not common and what does exist is largely due to causes other than under-nourishment; but it is significant that percentages of bad nutrition are generally highest in the distressed areas, Durham county showing much the worst count. Of the boroughs and urban districts, Mountain Ash U.D. with 8·4 per cent. and Jarrow with 6·7 per cent. bad nutrition are notable exceptions to the average of less than 1 per cent. Numerous tests for nutrition are being tried out, all of which are helpful, but nutrition being a dynamic function can never be fully assessed by static measurements. Like everything else in human biology, chemistry and physics can give us evidence but it requires a physician to make a diagnosis.

RESULTS

In the conclusion Sir Arthur MacNalty discusses the results of the school medical service, which has been in operation for 27 years. He asks: What is the country getting in return for this expenditure? Has the enormous amount of money and time and intelligence given to this function produced an adequate return? The striking improvement in cleanliness and nutrition, the growing rarity of the graver diseases, such as tuberculosis, and the amount of treatment carried to a successful issue for minor diseases which formerly were neglected, is some answer to this; but, for several reasons, statistically the results appear to be much less good than they are in fact. Some of the defects of children, such as refractive errors and low intelligence, are physiological deviations which can be relieved but not abolished, so these show no drop in figures. In other matters our standard has steadily advanced. Thus, formerly, ear disease meant otorrhœa with visual or olfactory evidence; to-day we have aural clinics to discover the commoner and less obvious disorders of the ear. Running nose and the catarrhal conditions which go with it were hardly noticed at all in the early days of inspection; to-day, though these are far less common than they were, they are an important element in school work.

The dental service is not yet fully developed. There are about 5,000,000 children on the elementary school roll. In 1935, 3,366,818 of these were dentally inspected and 2,290,404 required treatment. Treatment was provided for 1,474,083, but "it is not to be presumed that they all received complete treatment." However, for the first year in the history

of the service, the number of fillings of permanent teeth exceeded one million. This is the best evidence that progress is being made.

The research work done by the school medical officers is important but not spectacular. At the end of the report is a table of special inquiries and reports done in 1935, but this does not give a just idea of the amount of research carried out in field experiment and observation. Various special clinics, such as those for rheumatism, goitre, nutrition, &c., are really research stations from which knowledge of disease can be obtained not available to us in other ways and which are helpful in building up the science of human biology upon which our system of medicine rests.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 19TH, 1936

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2053; diphtheria, 1334; enteric fever, 21; pneumonia (primary or influenzal), 982; puerperal fever, 31; puerperal pyrexia, 106; cerebro-spinal fever, 18; acute poliomyelitis, 7; acute polio-encephalitis, 1; encephalitis lethargica, 5; dysentery, 29; ophthalmia neonatorum, 71. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 25th was 3207, which included: Scarlet fever, 988; diphtheria, 1069; measles, 18; whooping-cough, 391; puerperal fever, 14 mothers (plus 7 babies); encephalitis lethargica, 284; poliomyelitis, 4. At St. Margaret's Hospital there were 10 babies (plus 4 mothers) with ophthalmia neonatorum.

Deaths.—In 122 great towns, including London, there was no death from small-pox or enteric fever, 3 (0) from measles, 5 (1) from scarlet fever, 16 (4) from whooping-cough, 36 (2) from diphtheria, 44 (9) from diarrhœa and enteritis under two years, and 57 (12) from influenza. The figures in parentheses are those for London itself.

Doncaster reported 3 deaths from scarlet fever. Fatal cases of diphtheria were reported from 22 great towns, Liverpool 8, Hull 5, Birmingham 3.

The number of stillbirths notified during the week was 254 (corresponding to a rate of 41 per 1000 total births), including 32 in London.

PANEL AND CONTRACT PRACTICE

The Capitation Fee for Adolescents

THE Government is proposing to extend medical (not sickness) benefit under the National Health Insurance Act to boys and girls of 14–16 who are in insurable occupations—estimated at about a million. The benefit to be offered will be identical with that available to other insured persons except that young persons will not have to wait so long before receiving dental benefit. From the practitioner's standpoint the terms will be the same except that as there is no sickness benefit there will, strictly speaking, be no sickness certification. At a conference with representatives of the Insurance Acts Committee on Nov. 4th the Ministry tentatively suggested a capitation fee of 6*s*. (instead of the usual 9*s*.) on the grounds (1) that practitioners will have no bother about certificates, and (2) that these adolescents will need less attention than ordinary panel patients. The representatives of the Insurance Acts Committee said that they could not for one moment accept this second suggestion—that the medical care of young persons will prove less onerous—and in this they were supported by a leading article in THE LANCET of Dec. 5th. In a statement of their views the Committee expressed their astonishment that the Ministry should make such a suggestion and said that while the services given by practitioners to young people are different in kind they are more rather than less important than those rendered to older members of the community. The Ministry's proposal to remunerate insurance practitioners at a cut rate for these services would damage national health insurance as an instrument of positive health—as opposed to its function of healing established disease—and would not encourage them to give the full preventive and curative service needed at the difficult time of transition between school life and wage-earning. "It is," said the Committee, "a retrograde and reactionary proposal." Moreover, the selection of a group of insured persons for whom a different capitation rate should be paid was opposed to the principle underlying the existing basis of remuneration, and if it were introduced the Committee would have to consider its wider application in national health insurance and especially its application to the increasing proportion of old people in the community and to women.

After pointing out objections to direct payment to approved societies for the purpose of dental benefit—which "can only, under existing arrangements, aggravate the existing inequalities in relation to additional benefits"—the Committee went on to question the advantage supposed to be gained by the practitioner by lessening of certification. "Although," they admitted, "he will not be required to undertake the actual filling in of national health insurance certificates, his responsibility in so far as certification is necessary for other purposes remains unchanged. For example, his employer will require certification of evidence of incapacity in most cases."

On these grounds the Insurance Acts Committee decided that unless an offer of the standard capitation rate, less a deduction of not more than 5 per cent. in respect of certification, were made, they would summon a special conference of local medical and panel committees and recommend it not to accept the Ministry's proposals. On Christmas Eve the Ministry's reply was received. On the general question of the amount of care involved it said that while the Minister "remains satisfied that persons within the age-group in question are likely, having regard to their comparatively low sickness experience, to make fewer demands on the services of practitioners than persons of older ages, he does not wish to press this point unduly, since he recognises that in the interests of public health it is desirable that juvenile workers should remain as far as possible under medical supervision." As for certificates, the Minister maintains that account must be taken not only of the actual work of issuing them but also of the extra visits paid by patients merely to obtain them; and he still contends that, despite the possible demands of employers, adolescents will give the practitioner relatively little trouble in certification. In all the circumstances, he adds, he is "prepared to provide for a capitation fee of 7*s*. 6*d*. on the understanding that if the standard capitation fee for adults should be increased or reduced in future the rate for juveniles should be varied proportionately."

The Insurance Acts Committee, receiving this reply, have summoned a conference of local medical and panel committees for Thursday next, Jan. 7th, at 2 P.M. "It will be observed," they say, "that while the original contention of the Ministry that less work will be involved in the care of these young adolescents is not pressed, certification has been valued for the purposes of the deduction at 1*s.* 6*d.* and a capitation fee of 7*s.* 6*d.* offered." The committee will recommend the conference to reject this offer.

MEDICAL NEWS

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—G. F. C. Harvey, Univ. of Manch.; G. G. Sahasrabuddhe, Univ. of Bombay and West London Hosp.; and J. S. Wood, Univ. of Liverp.

Medicine.—J. T. Boocock, Univ. of Leeds; and J. S. Wood, Univ. of Liverp.

Forensic Medicine.—J. S. Wood, Univ. of Liverp.

Midwifery.—J. R. Audy and J. M. Lea, Guy's Hosp.; J. E. R. Palmer, St. Mary's Hosp.; and O. Rochlin, Univ. of Melb. and London Hosp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: G. F. C. Harvey, J. M. Lea, and J. S. Wood.

Royal College of Surgeons of England

A special lecture on the treatment of cardiac ischæmia will be given by Mr. Laurence O'Shaughnessy in the lecture theatre of the Royal College of Surgeons on Friday, Jan. 15th, at 5 P.M. Viscount Dawson of Penn, president of the Royal College of Physicians, will give a short introductory address.

University of Leeds

At the annual dinner of the Old Students' Association, held on Dec. 19th, Prof. C. M. Gillespie anounced that the University Grants Committee of the Treasury had voted a sum of £15,000 towards the scheme for providing suitable accommodation for the students' union. Encouraged by the past and present students' action in having collected some £4000, Mr. W. Riley-Smith made the handsome donation of £25,000 last June. The sum of £50,000 would have been required to carry out the original plans, but these may be slightly modified and the work can now be started with confidence. It is hoped that the further sum of £5000 needed for equipment will soon be forthcoming. Though the site that has been reserved will be within the area occupied by the greatly extended buildings of the University, it is not far from the medical school and the infirmary and will, it is hoped, act as a bond of union between the various faculties of the University.

International Hospital Congress at Paris

The next International Hospital Congress will take place in Paris from July 6th to 11th in the "Arts and Professions" Building, 9, bis avenue d'Iéna. Dr. René Sand, Dr. W. Alter, and Monsieur Sarraz-Bournet will represent the International Hospital Association on the committee, and a programme of lectures and discussions has been prepared, including French, German, Italian, and English speakers on the national planning of hospital services. Other subjects to be dealt with are: hospital visiting; the rights of the hospital in regard to case-histories of patients; general nursing; hospital finance and publicity; and the hospitalisation of mental cases. Arrangements are being made to organise a visit of several days' duration to the Lyons district for the week immediately preceding the congress. The hospitals of Lyons, the sanatoria of the Alps, and the hospices of Beaune would be among those visited. During the congress afternoon visits will be made to large hospitals, including the Cancer Hospital at Villejuif. The secretary of the association may be addressed at 87, Lord-street, Liverpool, 2.

Pharmaceutical Society of Great Britain

A meeting of this society will be held at 17, Bloomsbury-square, London, W.C., on Tuesday, Jan. 12th at 8.30 P.M., when Dr. F. B. Parsons, anæsthetist to Addenbrooke's Hospital, Cambridge, will lecture on anæsthetic agents.

German Society for Study of the Circulation

The tenth congress of the Deutsche Gesellschaft für Kreislaufforschung will take place at Bad-Nauheim on March 13th and 14th under the presidency of Prof. E. Stadler. The main subject for discussion will be circulation and inner secretion, and the principal speakers will be Sir Henry Dale, H. Rein (Göttingen), F. Schellong (Heidelberg), W. Haupt (Jena), M. Bürger (Bonn), and G. W. Parade (Breslau). Those who wish to attend should communicate with Prof. E. Koch at the Kerckhoff-Institut, Bad-Nauheim, before Feb. 1st.

Post-graduate Courses in Berlin

International post-graduate courses are to be held in Berlin on the following subjects: internal medicine (Feb. 22nd to March 6th); surgery and industrial diseases (April 5th to 10th); urology (April 12th to 17th); radiology (April 16th to 23rd); orthopædics (April 19th to 24th); tuberculosis (May 3rd to 8th); and homœopathy (April 5th to 30th). Monthly courses in all the special departments of medical science, including practical work, will also be held. Particulars may be had from the information bureau of the Kaiserin Friedrich-Haus, Robert Koch-Platz 7, Berlin, N.W.7.

Appointments

BRUCE, H. W., M.D. Lond., F.R.C.S. Eng., has been appointed Principal Medical Officer, Central Administrative Staff of the London County Council.

*HOLDERNESS, R. C., M.B. Lond., D.P.H., Medical Officer of Health and School Medical Officer for Loughborough.

St. Mary's Hospital for Women and Children, Plaistow.—The following appointments are announced:—

GORDON, W. H., M.D. Glasg., D.O.M.S., D.P.H., Hon. Ophthalmic Surgeon;

APPLIN, H. W., M.B. Lond., D.O.M.S., Hon. Ophthalmic Surgeon; and

ELGOOD, C., D.M. Oxon., M.R.C.P. Lond., Hon. Assistant Physician.

Certifying Surgeons under the Factory and Workshop Acts: Dr. D. H. S. BOYD (Hungerford District, Berkshire).

Medical Referee under the Workmen's Compensation Act, 1925: D. L. DAVIES, M.S., M.D., F.R.C.S., of Cardiff, for all County Court Districts at present comprised in Circuits Nos. 24 and 30 for Ophthalmic Cases.

* Subject to confirmation.

Births, Marriages, and Deaths

BIRTHS

LLOYD STILL.—On Dec. 21st, at Welbeck-street, W., the wife of Captain R. M. Lloyd Still, of a son.

MARRIAGES

GRACE—DISNEY.—On Dec. 19th, at All Saints' Church, Ottawa, Archibald John Grace, F.R.C.S., to Mary Kathleen, younger daughter of the Rev. R. B. Disney, of Eydon, Rugby.

JOLLIFFE—WALLIS.—On Dec. 19th, quietly, at Christ Church, Folkestone, William Anthony Jolliffe, Surg.-Comdr., R.N., to Eileen Mary Wallis.

DEATHS

BERRY.—On Dec. 14th, at Southport, Australia, Robert Sewers Berry, M.R.C.S. Eng., J.P., eldest son of the late Thomas Darby, of Curry Rivel, Somerset, in his 68th year.

BOWSER.—On Dec. 27th, at Penrith, J. Edward Bowser, M.B., C.M. Edin.

DAVIES.—On Dec. 25th, at Kingston Hill, Percy Vernon Davies, M.R.C.S. Eng., Medical Superintendent of the Kingston and District Hospital.

GODSON.—On Dec. 24th, at Slurring Crags, Windermere, Francis Arthur Godson, M.B. Camb.

HASSLACHER.—On Dec. 26th, suddenly, at Arosa, Switzerland, Francis Joseph Maria Hasslacher, M.B. Lond., F.R.C.S. Eng., of Burton-court, Chelsea, aged 62.

LENDON.—On Dec. 24th, at Holland Park-avenue, W., Edwin Harding Lendon, D.M. Oxon.

MARTIN.—On Dec. 22nd, in London, Edward Fuller Martin, M.D. Edin., of Weston-super-Mare, in his 80th year.

SAINSBURY.—On Dec. 29th, Harrington Sainsbury, O.B.E., M.D., F.R.C.P. Lond., in his 84th year.

TIDBURY.—On Dec. 22nd, at Woking, Lieut.-Col. James Tidbury, O.B.E., R.A.M.C. retd.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

PRECOCIOUS PEOPLE*

BY C. R. CROFT, D.M., M.R.C.P.
MEDICAL REGISTRAR AT THE PRINCE OF WALES'S HOSPITAL, PLYMOUTH

THERE is a French proverb to the effect that "It is not sufficient to run fast, you must also start in time." On the other hand it is said that the precocious child is like an early riser, conceited all the forenoon of life, stupid and uninteresting all the afternoon and evening. It seems to be a popular idea that those whose mental powers develop precociously in childhood are closely related to the degenerate, imbecile, and insane, and that they come to no good or die prematurely or unhappily. Unfortunately medical literature provides only a few studies of precocity and these are mainly devoted to precocity in the sexual sphere.

Of the various forms of intellectual precocity, the first may be called "normal," because it is merely an early manifestation of mental development of the highest adult type—sometimes rising towards what is called the *intellectus universalis*. Another form is the one-sided precocity in which a single faculty is exalted at the expense of others, as in *idiots savants*. Thirdly there is the morbid or forced precocity, "psychasthenic precocity," the result of over-pressure and likely to be barren. It was of this type, which he related to what we know as the "acidosis type," that Guthrie remarked: "The precocious child is not necessarily a genius, but by careful management he may at least be prevented from becoming a failure." Fourthly there has long been a text-book tradition that tumours of the pineal gland are associated with precocious mentality.

The Universal Intellect

Of the first group, having the intellectus universalis, Goethe is quoted as the finest example. At nine he understood German, French, Latin, Greek, and had learnt Italian incidentally by hearing his sister take lessons in the language while he himself was engaged in his own studies. One teacher claimed him as a predestined man of science, another as a brilliant artist, a third as a theologian, a fourth as a courtier, a fifth as a diplomat, and a sixth as a jurist, and it is true that in most of these rôles he excelled; though it is curious that apparently no one predicted that he would be a poet. It is of Goethe that Napoleon said, "voilà un homme." It is interesting to note that at the age of 17 he was confined to bed for many months as a result of hæmorrhage. He died at 83.

Next we may take Dr. Thomas Young who died at 56. At 2 years old he could read fluently, and before he was 4 he had read the Bible twice. Before leaving school at 13, apart from the standard Greek and Latin of the day, he had got through six chapters of the Hebrew Bible, had learnt to use the lathe, and had made a telescope and a microscope. The Italian, Persian, Syrian, and Chaldee languages all occupied his attention, and later he added Samaritan, Arabic, Turkish, and Ethiopian. Despite his knowledge of natural philosophy he was one of the less successful products of St. Bartholomew's Hospital, and his later activities included the discovery of the undulatory theory of light, the deciphering of Egyptian hieroglyphics, the ascertaining of the length of the seconds' pendulum, and the superintending of the nautical almanac.

Such recitations of virtue, unlike the recitation of vice, become tedious; but I cannot leave the subject without quoting the astonishing story of a boy called Clench, who was examined at the age of 11 by Pepys and Evelyn together. The following is a quotation from Evelyn's diary:—

"There was not anything," Evelyn says, "in chronology, history, geography, astronomy, courses of the stars, longitude, latitude, doctrine of the spheres, courses and sources of rivers, creeks, harbours, eminent cities, boundaries and bearings of countries, not only in Europe, but in any other part of the earth, which he did not readily resolve and demonstrate his knowledge of. He was not only able to repeat the famous things which are left to us in any of the Greek or Roman histories, Monarchies, Republics, Wars, Colonies, exploits by sea and land, but all the sacred stories of the old and new Testament, the succession of all the Monarchies, Babylonian, Persian, Greek, Roman, with all the lower Emperors, Princes, Heresiarchs, and councils,—what they were called about, what they determined; or in the controversy about Easter, the tenets of the Gnostics, Sabellians, Arians, Nestorians; the difference between St. Cyprian and Stephen about rebaptization; the Schisms."

He answered questions on synchronisms, Olympic years, civil laws, and on the digest and code, and gave a stupendous account of both natural and moral philosophy, and even in metaphysics. "He was perfect in Arithmetic, Latin authors and French, and was newly entered into Greek." "He was as beautiful and lovely in countenance as in knowledge," and appears to have had very pleasant manners. The only criticism one can level against this examination is that it took place at the Admiralty, and after dinner. I have been entirely unable to trace the boy's subsequent career. His father who was a doctor was murdered in his coach and that is all I can find out about him. Evelyn's own son, who died, it seems, of malaria as a boy, had something of the same brilliance, and his achievements are also recorded.

Taking a few great names at random we find marked precocity in John Stuart Mill, who died aged 67, in Leonardo de Vinci, who died at the same age, and in Sir Christopher Wren who died at 91 Isaac Newton had the three great discoveries conceived in his mind before he was 24, and died at 75. Other great men obviously very precocious, but whose records are less complete, include James Watt (83); Haller who besides his scientific achievements—he first appreciated the mechanism of respiration—was also an administrator and a poet (70); Bacon, that wisest, brightest, meanest of mankind (65); and Aristotle (62), Galileo (78), and Grotius or van Groot (62).

Following the work of James Sully, Guthrie points out that the order of development of mental precocity follows the normal development of mental faculties. These may be placed in three groups: first, those subserving sensory impressions, in which precocity is shown by musicians and artists; secondly, faculties dependent on the formation of mental images, illustrated by the poets and fiction-writers; and lastly, faculties dependent on the formation of abstract ideas, which are exhibited by the philosophers. In precocity musicians are the most striking and philosophers the least, while the poets and fiction-writers are intermediate, and scientists appear to fall between the second and third groups.

One-sided Development

At one end of the scale there is exultation of all faculties, the intellectus universalis; at the other end is great development of one faculty while others are in abeyance. It is here, as I have said, that we find the idiots savants. These have been studied by Langdon-Down, and he quotes remarkable cases where there was great aptitude only for mental arithmetic and calculation, or mimetic faculty, manual skill and dexterity, or musical ability.

* Based on a paper read to the Plymouth Medical Society on Nov. 13th, 1936.

A striking example of this kind was Blind Black Tom of Boston, Massachusetts. He was born a slave in 1850, a blind imbecile of the lowest negro type, coal black, with protruding heels, ape-like jaw, and blubber lips constantly open. At 12 he was exhibited all over the State as a musical prodigy. Although incapable of understanding the simplest conversation, and like a child of 3 in conduct, he had a large repertoire of classical and operatic music which he played entirely by ear. He could repeat any piece of music after once hearing it played, and could supply the bass to the treble of music heard for the first time. One of his turns was to play seated with his back to the keyboard. His memory was astonishing: he could repeat a conversation fifteen minutes in length without loss of a syllable, yet without understanding a word of it. It was purely an auditory memory that compares somewhat with the calculating prodigies.

From abnormal types of this kind we work upwards to the men of brilliant qualities whose faculties lie in some special direction. *Musicians* supply the most surprising and constant examples; in fact it may be said that only one great composer—namely, Wagner—failed to show a very early bent.

It would be tedious to enumerate instances of musical precocity. Mozart played minuets at 4, and in his fifth year he composed concertos. Schubert was composing at 11, and even the backward Wagner at the age of 15 became inspired with an overpowering passion for the art after hearing Beethoven symphonies. Mendelssohn first played in public at 9 and wrote his first work at 11. There is of course among musicians a very strong hereditary talent of which Bach is perhaps the most remarkable instance, the family being important in the history of music for two hundred years. Of forty composers whose records are collected by Sully thirty-eight (95 per cent.) showed great bent before they were 20; among twenty-seven of them ten began composing before 15, fourteen between 15 and 20, and only three after 20.

Mathematicians seem to come next; that is, those with the power of calculation independent of profound thought—another type of idiots savants. Those capable of rising to greatness in this direction must clearly have a full share of the intellectus universalis; but one or two examples of the calculating type may be of interest. It seems possible that the power of rapid calculation, too rapid to be based on a process of reasoning, is related in some way in its mental process to the musicians control over the musical scale, and may be compared with musicians' tone-images. The scale of figures is of the same kind as the scale of musical notes.

George Bidder who died in 1878 at the age of 74 was perhaps the most celebrated calculating boy. His history is of some interest. He was born at Moretonhampstead, and his father took him round on exhibition. From this he was rescued by Sir John Herschel and sent to school at Edinburgh. He became connected with the development of the railways in England, Belgium, and Scandinavia, and his principal memorial is Victoria Docks, London, which he designed. He was also a founder of the Electric Telegraph Company. He is said to have been unsurpassed for calculation, but clearly his work does not lie in the realm of genius.

Painters can be placed next with sculptors. Much recitation of their precocity would be boring, but a remarkable example is George Moreland, who is said to have taken pencil and crayon in hand as soon as he left the cradle. Sketches of his at 4, 5, and 6 were exhibited at the Society of Artists. Common ages for the production of notable work vary from 9 to 14, and among the young artists may be mentioned Montegna, Titian, Tintoretto, Michael Angelo, Murillo, Holbein, Sir Thomas Lawrence, Turner, Ingres, Wilkie, van Dyck, and Rubens. Of sculptors can be mentioned Canova and Flaxman.

Of fifty-eight artists forty-two (75 per cent.) showed decided skill before 15 years and 80 per cent. before 20. In a group of forty-two, twenty-eight (67 per cent.) were famous before they were 25. None can be traced to whom fame came after 40 years.

Among the *poets* great precocity is seen in Goethe, de Musset, Victor Hugo, Cowley, Pope, Byron, and Coleridge. Elizabeth Barrett Browning read Homer in Greek at 8 and wrote poetry at the same age. Of 49 poets 66 per cent. wrote before 20, 92 per cent. wrote before 30, and 56 per cent. were famous at 25.

Novelists.—Remarkable precocity was shown by Scott, Dickens, Lytton, Balzac, and Hoffmann; also the Brontës and Miss Burney. Of twenty-eight novelists 75 per cent. showed power before 20, but there are a number of instances of late exhibition of power of whom Defoe, de Morgan, Hardy, and Conrad come to mind. Although promise is shown thus early in novelists their fame is delayed, though 80 per cent. have reached distinction at 40.

We then turn to *scholars* and *historians* and here are again approaching the pure intellectus universalis unaccompanied by special development of talent. Nevertheless one factor is of special importance in this group, and that is the power of memory. Macaulay is one of the most famous examples of this. At the age of 4 he was taken to the Oxford Collection, and he remembered the catalogue for ever after. Before he was 8 he had written a compendium of universal history and other heavy works. Of art he confessed himself quite ignorant, and he recoiled from mathematical studies. Many scholars showed similar traits. Memory is the foundation of scholarship and the secret of success in examinations. It may be said that no great man ever had a bad memory, but a good memory does not make a great man.

As examples of precocity in scholarship may be mentioned Grotius, Porson, Macaulay, Thirlwall, and Gibbon. The records of a group of scholars shows that 83 per cent. were definitely precocious and, while only 20 per cent. achieved distinction at 25, 90 per cent. were recognised at 40.

The next in the scale show a larger infusion of intellectus universalis—the *men of science*. Among them are many instances of juvenile distinction. Most of them produced outstanding contributions to knowledge in their early twenties. Galileo as a boy discovered that the beats of a pendulum are isochronous. Haller, the father of physiology, was exceedingly precocious; and so as I have said already were Isaac Newton and James Watt. Naturalists are similarly endowed. Linnaeus and Cuvier are examples of these, and, although Harvey did not publish his discovery until the age of 50, he expounded it 12 years before this. Benjamin Franklin, making his first, and this a discovery of the first order, at the age of 50, is almost unique. He is also peculiar in being one of the few great discoverers who died insane.

It is calculated that 75 per cent. of men of science have shown distinct promise before 20, and 70 per cent. are famous at 30. In about 8 per cent. only was fame delayed until after 40.

Among *philosophers* Berkeley is the most astonishing example. His "New Theory of Vision" was published at the age of 24 but conceived at 18. Heine and J. S. Mill are also instances of precocious mentality. Leibnitz was busy at 17. Many however only achieved distinction after 50, such as Descartes, Hobbes, and Locke, with Kant at 46. Of a group of thirty-six only 54 per cent. produced work before 20 and 55 per cent. under 30, while 23 per cent. had to wait for renown until they were past 50.

Summarising the results of an analysis of this kind we find that distinct promise is shown before the age of 20 as follows:—

Musicians	95%	Poets, Novelists, Men of science	75%
Artists	89%	Philosophers	66%
Scholars	83%		

Finally we come to the people who may be called *leaders of men*. This group includes military, political, and industrial leaders, and their characteristics are peculiar, for history is singularly silent as regards their early precocity, though their great work is usually completed at an early age, and if they survive this period their reputation is apt to suffer. An exception is Chenghis Kahn—perhaps the greatest conqueror the world has seen—who did not begin his greater campaigns until the age of 40, but died, still a campaigner, at the age of 65, with an empire extending from the Dnieper river to the China Sea. Alexander the Great on the other hand began his career of conquest at 20 and his work was done at 32. Cæsar's main activity extended over about 12 years until he was murdered at 56. Napoleon was not particularly distinguished as a young officer. His active period extended over only 20 years and he was only 46 when Waterloo was fought. Wellington —" my dull boy Arthur " as his mother called him— was 55 on the same occasion. Marlborough's great period was 46–50. Charlemagne finished fighting at 55 and died at 72. Nelson died with his work done at the age of 47. The gallant escapades of his youth, which largely won his recognition, were partly dependent on the fact, as he himself admitted, that he had no sense of fear. Mussolini, who is 53, was unheard of more than 15 years ago. Hitler is 47 and has only been known outside Germany for some 11 years. It is clearly not the man who plods with peacetime professional grace to the top of the tree who will be the great war commander.

It seems appropriate to consider why the biological details of persons of this group should differ so markedly from those of the other groups, whose names like theirs will ever be on men's lips. I see no other alternative than to regard them as of a fundamentally different biological type in their achievements.

The Physical Side

We turn finally to the physical aspect of precocious individuals. There are two main clear-cut groups—namely, those with pineal tumour and those with suprarenal tumour. There is no doubt that precocious sexual development is a definite clinical sign in tumours of the pineal gland, exhibited as enlarged genitalia in cases occurring before puberty, as was first shown by Ogle in 1899. Recent experimental work has confirmed this. Hanson reports from experiments in rats that if a pineal extract is injected into rats and this injection continued through nine or ten generations there is a progressive acceleration in development of size and of sexual maturity. It seems that a strong case is being made for including the pineal gland among the endocrines. What evidence is there that the pineal affects mental development? It is at present clinical rather than experimental. Horrax and Bailey in 1925 described 12 cases of pineal tumour from Cushing's clinic. Of these cases 5 were developed before puberty and 4 were in boys. Of these 4 boys 3 showed mental precocity and they deserve description.

1. Aged 6: "Developed exceptionally well. Tall for age, genitalia normal."

2. Aged 11: Full sex characters and deep voice; "accompanying his physical and sexual maturity there was a corresponding intellectual maturity in advance of his age."

3. Aged 3: Two teeth at 2 months, seven teeth at 4 months, talking at 8 months, walking at 9 months. "Extremely intelligent and far advanced for his age. Learned to ride a velocipede and had been roller skating during this his third year."

Further cases of pre-puberty pineal tumours are recorded, to a total of 14. All are in boys and 6 showed mental precocity. Perhaps the ancients were not far wrong in regarding the pineal as the seat of the soul.

The relationship of precocious sexual development to suprarenal tumours was first established by Bulloch and Sequeira (1905). Their paper describes 12 cases of precocious sexual development with suprarenal tumour of which 10 were female and 2 male. Of 13 further cases of tumour without precocious development, 8 were female, 4 male, and 1 of doubtful sex. In a further collection, by Jump, Beates, and Babcock, of 18 cases, 14 were girls and 4 boys. They remark "some showed mental precocity, though the majority were probably mentally dull."

So far as sexual precocity is concerned, it seems that in girls the condition is usually associated with suprarenal disorder, while in boys the association is more commonly with a disordered pineal gland, and mental precocity is often present also. I do not propose to draw any conclusions from these facts. But if speculation were permissible one might visualise not only a time when our mental deficients will be rendered normal with pineal extracts, but ordinary intelligence may be made extraordinary by the same means. Let us hope, then, that its use will be carefully regulated. The idea of a Leonardo de Vinci to paint your house, a Wren to mend it, and a Macaulay, a Lenin, and a Hitler on the parish council cannot be anything but a nightmare.

I wish to record my thanks to Mr. J. S. Shields of the B.M.A. library for his great help in securing the variety of books for which I asked him, often from libraries other than his own. Also amongst the shades, I must thank in particular those of Dr. L. G. Guthrie and Prof. James Sully, whose work has been freely used.

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THE PUBLIC AUTHORITIES PROTECTION ACT

THE Law Revision Committee, appointed by the Lord Chancellor to consider the alteration of legal maxims and doctrines in the light of the statute law and judicial decisions, has produced a fifth interim report (Cmd. 5334, H.M. Stationery Office, 9*d*.) which has a possible bearing on the liability of medical officers. The Committee has been delving into the uninspiring mysteries of the statutes of limitation which impose various complicated time-limits on the right to bring legal proceedings. After a prolonged examination of the general limitations which no layman will lightly essay to comprehend, the report deals with the time-limit under Section 1 of the Public Authorities Protection Act, 1893—a statute not infrequently pleaded in defending actions arising out of treatment in local authorities' hospitals.

The section relates to proceedings, whether criminal or civil, against any person for any act done in pursuance of an Act of Parliament, or of any public duty or authority, or in respect of any alleged neglect or default in the execution of any such act, duty, or authority. Such proceedings shall not lie or be instituted unless begun within six months after the act, neglect, or default complained of, " or, in the case of a continuance of injury or damage, within six months next after the ceasing thereof." The " continuance of injury or damage," mentioned in the passage quoted above in inverted commas, has been interpreted by the judges to mean the continuance of the act which caused the damage. There are other complications which the curious may pursue in the reports of cases like Venn *v.* Todesco (1926, 2 K.B. 227),

where the medical officers of the Croydon Borough Hospital were said to have been at fault, and Harnett *v.* Fisher (1927, A.C. 580), which indicated the possible clash between the Lunacy Act and the Act of 1893.

Be those problems what they may, the Law Revision Committee now recommends that the six-months time-limit under the Public Authorities Protection Act, 1893, should be enlarged to twelve. The policy of the 1893 Act, it says, is quite clear—namely, to protect absolutely the acts of public officials, after a very short lapse of time, from challenge in the courts. The Committee cryptically remarks that such a policy might be justifiable in the case of important administrative actions where serious consequences might follow if the actions were impugned after a long interval. But the real use of the statute has been found to lie in protecting "cases of negligence of municipal tram drivers or medical officers and the like." This slightly contemptuous description of the classes of public servant concerned is followed by the observation that "there seems no very good reason why such cases should be given special treatment merely because the wrong-doer is paid from public funds."

The suggested extension of the time-limit under the 1893 Act is the more striking because the Law Revision Committee, elsewhere in its report, is mainly recommending reductions rather than extensions. The general object of the Statutes of Limitation, as the report makes clear, is not merely to prevent delay in the making of claims; they aim at putting a certain end to litigation and at preventing the resurrection of old claims, whether there has been delay or not. Even a medical officer (who, after all, does not practise for private profit) may be at a disadvantage in defending himself against claims for alleged negligence when they arise out of some brief incident of a busy day more than six months before.

FIRE PRECAUTIONS AT HOSPITALS

TEN years ago the management committee of King Edward's Hospital Fund for London took counsel with the chief officer of the London Fire Brigade about the precautions desirable to avoid the danger of fire in hospitals or to mitigate its results. The result was the issue of an important memorandum. Happily fires occur very rarely in London hospitals, but it requires day-by-day vigilance to forestall the risk, and to this vigilance the Hospital Fund's memorandum has been a useful stimulus. The memorandum has now been revised up to November, 1936, and can be obtained from George Barber and Son, Ltd. (23, Furnival-street, London, E.C.4, 6*d.* post free). We take this opportunity of extracting from the memorandum the steps to be taken in case fire *did* break out. These are Items 55 to 62; Item 54 dealt with the arrangements for a responsible official to be informed at the same time as the fire brigade is summoned.

Upon the discovery of a fire all doors and windows in the vicinity should be kept closed as far as possible, in order to exclude draught.

The person discovering the fire should, after having made sure that the alarm has been given and that the fire brigade has been summoned, attack the fire by means of the appliances available.

If hydrants are provided, the hose should be extended from the nearest hydrant, care being taken to keep the hose free from kinks; but the water should not be turned on unless it is evident that the extinguishers and fire buckets are insufficient to extinguish the fire.

If the fire is of an electrical nature, sand only should be used in the first instance, and the current should be cut off.

For oil, spirit, and fat fires, foam type extinguishers should be used.

For a person's clothing alight, or if the fire is small, wraps, blankets, rugs, &c., should be used.

Nurses on duty should move patients from the proximity of the fire, or, if necessary, evacuate the ward. Patients may be removed on bedding if essential, but beds or furniture should not be removed.

The officers who have been previously detailed for the purpose should proceed to the various wards, &c., in order to allay any tendency towards panic, while the remainder of the staff should proceed to whatever stations have been allotted to them; or should leave the building.

A NEW HEARING-AID

THE type of hearing-aid in which amplification is obtained by means of thermionic valves is deservedly becoming more popular. It has several advantages over the more familiar simple microphone type, among which are improvement of hearing at a distance, greater freedom from distortion, and (most important) the ability to increase the amplification at any desired part of the scale. The disadvantages of size and weight have recently been lessened by improvements in design, and a new model submitted to us by Messrs. Auraphone Ltd., of 120, Wigmore-street, London, W.1, is very compact, being contained in a neat box measuring $6\frac{1}{2} \times 4\frac{3}{4} \times 1\frac{7}{16}$ in. Two valves are employed actuated by a dry high-tension battery and a small low-tension accumulator, for which a trickle-charger can be provided. The tone-control is adjusted by a recessed screw, accessible with a screwdriver, and is not intended to be moved by the patient. For the receiver a specially packed carbon-granule microphone is employed, which operates in any position, and a choice is available from six microphones having different degrees of power and freedom from background noises. The standard earpiece is light and neat, and is held in position by a spring band, or a midget earpiece may be used, of which there is a great variety, to ensure a comfortable fit in the concha; alternatively a bone-conductor may be employed, and this is provided with a more powerful spring band to ensure good contact. The case may be carried by a sling worn over the shoulder under the coat, by a strong clip fixed to waistband or braces, or in a lady's handbag with space provided for receiver and earpiece, as well as for handkerchief and other necessaries. The model examined worked very well with a minimum of distortion; the design has been carefully thought out, and the price, 12 guineas with the standard earpiece, is a moderate one. The instrument may be taken on trial before purchase—an important provision which should be, but is not, always observed by makers of hearing-aids.

LECTURES ON AIR-RAID PRECAUTIONS

THE London Post Office Corps of the St. John Ambulance Brigade have arranged a course of lectures which will be held at Marylebone Town Hall on Fridays at 8 P.M. from Jan. 15th to Feb. 12th. The subjects to be dealt with include the effects of weather and topographical features, the classification of gases and their appropriate first-aid treatment, protective clothing, decontamination, and protection of the eyes and lungs. Demonstrations of how to use gas-mask Mark IV. and how to arrange for collective protection and protection in rooms will also be given. The fee for the course is 5*s.*, and application for admission should be made to the divisional superintendent, 58/4 W.D.O. Division, St. John Ambulance Brigade, Western District Post Office, W.1.

THE CIBA CALENDAR

THE calendar issued by Ciba Ltd., 40, Southwark-street, S.E.1, for 1937 combines the functions of a monthly and daily calendar in a convenient and practical manner. The days of the present and succeeding months are shown clearly on each page, and ample space is left for entries. The leaves are mounted in the form of a file on a pencil-stand which can be placed on the desk.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, Jan. 5th.
Orthopædics. 5.30 P.M. (Cases at 4.30 P.M.) Mr. Alan Todd: 1. Case for Diagnosis. 2. Protrusio Acetabuli. Mr. H. J. Seddon: 3. Slipped Femoral Epiphysis. Mr. H. J. Burrows: 4–6. Operations for the Correction of Madelung's Deformity.
WEDNESDAY.
Surgery. 8.30 P.M. Dr. A. M. Stewart-Wallace: Post-operative Gangrene of the Skin. Mr. V. H. Riddell: Peripheral Embolectomy. Mr. W. A. Jackman: Terminal Ileitis.
FRIDAY.
Ophthalmology. 8.30 P.M. (Cases at 8 P.M.) Mr. E. Wolff and Mr. T. Keith Lyle: Hemispherical Formations in Bowman's Membrane. Mr. Arnold Sorsby, Mr. A. Elkeles, Mr. G. W. Goodhart, and Mr. I. B. Morris: Experimental Staining of the Retina in Life.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.
FRIDAY, Jan. 8th.—7.30 P.M. (De Vere Hotel, Kensington), Mr. Eric Pearce Gould and Mr. C. T. Le Quesne: The Defence of Medical Negligence.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.
FRIDAY, Jan. 8th.—8.45 P.M. (Miller General Hospital, Greenwich), Clinical Evening.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
WEDNESDAY, Jan. 6th.—Noon, clinical and pathological conference (medical). 2.30 P.M., clinical and pathological conference (surgical).
THURSDAY.—Noon, clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Mr. Bright Banister: Cæsarean Section.
FRIDAY.—2 P.M., operative obstetrics. 2.30 P.M., Mr. W. B. Gabriel: Surgical Diseases of Rectum. 3 P.M., department of gynæcology, pathological demonstration.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics or operations, obstetrical and gynæcological clinics or operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, Jan. 4th.—10 A.M., skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics. 4.15 P.M., Mr. Arnold Walker: Carcinoma of the Cervix.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Mr. Woodd Walker: Fractures of the Femur.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics. 4.15 P.M., Dr. P. Manson-Bahr: Dysentery and Colitis.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, genito-urinary and eye clinics. 4.15 P.M., Mr. Davenport: Eye Lesions in Venereal Disease.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. H. W. Post: Demonstration of X Ray Films.
SATURDAY.—10 A.M., children's and surgical clinic. 11 A.M., medical wards.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Jan. 4th, to SATURDAY, Jan. 9th.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology.—WEST END HOSPITAL FOR NERVOUS DISEASES, Gloucester Gate, N.W. Tues., 8.30 P.M., Mr. R. Lindsay Rea: Demonstration on the Fundus Oculi.—PRESTON HALL, near Maidstone, Kent. Sat., demonstration on pulmonary tuberculosis.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, 42, Ranelagh-road, S.W.
FRIDAY, Jan. 8th.—4.30 P.M., Prof. Leonard Findlay: Acute Rheumatic Diseases in Childhood.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, Jan 8th.—4 P.M., Mr. Harold Kisch: Inflammation of the Tonsil.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY, Jan. 5th.—5 P.M., Dr. A. C. Roxburgh: Syphilis.
THURSDAY.—5 P.M., Dr. J. M. H. MacLeod: Ringworm Infections.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Jan. 7th.—2 P.M., Dr. R. T. Brain: Useful Remedies in Diseases of the Skin. 3 P.M., Dr. A. Signy: The Use of Vaccines and Sera.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

Vacancies

For further information refer to the advertisement columns

Barnsley County Borough.—M.O.H. and School M.O., £900.
Birmingham City Mental Hosp.—Jun. Asst. M.O., £350.
Bolingbroke Hosp., Wandsworth Common, S.W.—H.P., at rate of £120.
Bristol Royal Infirmary.—Sen. Cas. H.S. and Sen. Obstet H.S., at rate of £150 and £100 respectively. Also Res. H.P.'s and H.S.'s to Spec. Depts., each at rate of £80.
Bury County Borough.—Deputy M.O.H., £650.
Cambridge, Addenbrooke's Hosp.—Res. Anæsthetist and Emergency Officer, at rate of £130.
Cardiff Royal Infirmary and Welsh National School of Medicine.—Hon. Dermatologist and M.O. for Male V.D. Centre, at rate of £250.
Carshalton, Queen Mary's Hosp. for Children.—Res. Med. Supt., £1400.
Cheshire Joint Sanatorium, Market Drayton.—Res. M.O., £250.
Children's Hosp., Hampstead, N.W.—Res. M.O., at rate of £150.
Doncaster Royal Infirmary and Dispensary.—Res. Surg. O. and Cas. H.S., £250 and £175 respectively. Also Res. Anæsthetist, at rate of £175.
Dundee Royal Infirmary.—Hon. Asst. Visiting Surgeon for Gynæcological and Obstet. Dept.
Durham, Richard Murray Hosp., Blackhill.—H.S., £200.
East Ham Memorial Hosp., Shrewsbury-road, E.—Res. M.O., at rate of £200.
Glasgow Royal Faculty of Physicians and Surgeons.—Fellowship Examination.
Hastings, Royal East Sussex Hosp.—Jun. H.S., at rate of £150.
Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. for Out-patient Dept., at rate of £50.
Hosp. for Tropical Diseases, Gordon-street, W.C.—Res. Med. Supt., £400.
Hosp. of St. John and St. Elisabeth, 60, Grove End-road, N.W.—Surg. Reg., at rate of £100.
Hull Royal Infirmary.—Second Cas. O., at rate of £150.
India Government Medical Research Dept.—Gazetted Posts, Rs. 625. Also Gazetted Post, Rs. 250, &c., per annum.
Laboratories of Pathology and Public Health.—Jun. Pathologists, £500.
Leeds Public Dispensary and Hosp.—Research Worker in Arthritis, £500.
Leeds University, School of Medicine.—Readership in Surgery. Also Reader in Medicine, each £600.
Leicester Royal Infirmary.—Hon. Dental Surgeon. Also two Hon. Asst. Dental Surgeons.
Liverpool Royal Children's Hosp.—Res. M.O. and Res. Surg. O. for Heswall Branch, each at rate of £120. Also two Res. H.P.'s and two Res. H.S.'s for City Branch, Myrtle-street, each at rate of £100.
Liverpool Stanley Hosp.—H.P., two H.S.'s, and Gynæcological H.S., each at rate of £80.
London County Council.—Asst. M.O., Grade I., £350. Also Asst. M.O., Grade II., £250.
London Hosp., E.—Hon. Asst. Surgeon to Dept. of Neurosurgery.
Manchester, Crumpsall Hosp.—Res. Asst. Obstet. Officer, at rate of £250.
Manchester, Monsall Hosp. for Infectious Diseases.—Res. Asst. M.O., £350.
Metropolitan Hosp., Kingsland-road, E.—Cas. O. and Res. Anæsthetist, £100.
Middlesex County Council.—Physician for County Sanatorium, Harefield, £650. Also Radiologist, £3 3s. per session.
Middlesex Hosp. and Medical School, W.—Surg. Reg., £300.
New Zealand, Dunedin Hosp.—Radio Therapist, £1000.
New Zealand, Palmerston North Hosp.—Pathologist, £900.
Norwich, Norfolk and Norwich Hosp.—Res. Cas. O. Also Res. H.S. to Spec. Depts., each £120.
Pembroke County War Memorial Hosp., Haverfordwest.—Res. M.O., £150.
Preston and County of Lancaster Royal Infirmary.—Obstet. M.O., £1000.
Queen's Hosp. for Children, Hackney-road, E.—Clin. Asst. to Med. Out-patients, 5s. each attendance.
Royal Cancer Hosp., Fulham-road, S.W.—Res. M.O., £200.
Royal National Orthopædic Hosp., 234, Great Portland-street, W.—Two H.S.'s for Country Branch, each at rate of £150.
Sheffield Royal Infirmary.—Clin. Asst. to Surg. Dept., at rate of £300.
Southampton County Borough.—Ear, Nose, and Throat Surgeon, at rate of £300.
Stoke-on-Trent, Longton Hosp.—H.S., £160.
Westminster Hospital, Broad Sanctuary, S.W.—Asst. Surgeon.
Worcester County and City Mental Hosp., Powick.—Asst. M.O., £350.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at St. Ives (Cornwall) and Dunbar (East Lothian). Latest date for receipt of applications, 5th January, 1937.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Kettering, Northants. (Applications before Jan. 12th.)

ON WRITING FOR THE LANCET

JUST as the motorist is sometimes a pedestrian, so the writer is sometimes a reader. For this if no other reason we ask him to look at our Contributors' Code, whose general observance—though it contains nothing new to some careful drivers—would reduce casualties and free the editorial police for more useful duties.

LENGTH

Short papers are more likely to be read and more likely to be published. But papers can be long at 500 words and short at 5000, according to their material. The secret of brevity is repeated revision: the author's best friends are a month's delay and several candid critics.

LANGUAGE

Every sentence should be as simple as possible: apart from technical terms it should be intelligible at a first reading to any educated person. The pompous circumlocution often thought appropriate to scientific publications is an enemy to clear thinking and an obstacle to the spread of information among busy practitioners. The modern article, written in medical jargon instead of English, is apt to begin something like this:—

Though numerous instances have been recorded in the United States, examination of the literature with reference to idiopathic glandulosis suggests that this disorder is of relatively infrequent occurrence in this country. Up to the present time no consensus of opinion exists in connexion with the factors which may play an ætiological rôle in its causation; and in view of their variety, taken in conjunction with certain abnormal characteristics involved in their symptomatology, it would appear that the following series of cases under the present author's observation may be of sufficient interest to warrant being placed on record.

Given time, we might translate it thus:—

Though often reported in the United States, idiopathic glandulosis appears to be less common in this country. Its cause is still uncertain and I am recording these cases because the disease is rare and some of the symptoms were unusual.

The stigmata of jargon include over-use of words with abstract meanings (*of a blue coloration* rather than *blue*); of the passive voice instead of the active (*it is believed by Smith* instead of *Smith believes*); of long words or constructions, usually Latin in origin, instead of short ones (*subsequently to* rather than *after*). For an analysis and righteous condemnation of these and similar practices we refer those interested to Lecture V of Quiller-Couch's "Art of Writing" (Cambridge University Press). Meanwhile, though admitting the insecurity of people who live in glass houses, we offer examples of overworked, or misused, words and phrases, marking some of the most tiresome with an asterisk, and suggesting alternatives.

a degree of: *some*
*ætiological factor: *cause*
as a result: *hence*
a variety of: *many, various*
*case: *patient, child, man*
certain: *some*
commence: *begin*
consider: *think, hold, believe*
considerable: *much, large, high*
employ: *use*
exists: *is*
experimental dog: *dog*
extensive: *big, long*
fifty per cent.: *half*
following the: *after the*
frequent: *common*
*frequently: *often*
indicate: *show, suggest*
indication: *sign*
*individual: *person, man, woman, cat*
*in few instances: *seldom*
in large measure: *largely*
in regard to: *about*
in the case of: *in*
invariably: *always*
majority of: *most of*
*marked: *much, great, big, obvious, evident*
meticulous: *careful, elaborate*
nature: *kind, sort*
numerous: *many*
*occur: *happen, appear, develop, arise*
one-half: *half*
pathology: *disease, abnormality*
portion: *part*
practically: *almost*
previous to: *before*
prior to: *before*
prolonged: *long*
psychological: *mental, emotional*
regarding: *about, as to*
render: *make*
state: *say, write*
subsequent to: *after*
symptomatology: *symptoms*
theory: *opinion, idea*
to some extent: *somewhat*
would appear: *seem, appear*

Such favourites as *&c.*, *literature*, *phenomenon*, *respectively*, *stressed*, and *tendency* can often be omitted with advantage. And even scientific caution should have bounds: *apparently* is as good as *I cannot disguise from myself that it would appear that.*

We are sometimes asked, in accepting an article, to add where necessary "a few journalistic touches." But nowadays it is the layman, not the journalist, who writes journalese. Leading articles in the popular press are usually models of straightforward English.

MODESTY

The first person singular—the naked *I*—is no longer thought immodest. Elaborate garments such as *we* and *the author* do not disguise a writer's identity unless they also disguise his meaning; and medicine has no need of such aids to ambiguity. Not only the author's name should be given at the head of the paper, but also his decorations, his degrees and their source, and relevant diplomas. A statement of one or more appointments is preferable, in a general medical journal, to the vague formula "From the ——— Institute."

ANONYMITY OF PATIENTS

The patients' identity, on the other hand, must always be hidden. If in distinguishing between several of them it is convenient to use initials, the conventional *A. B.* or *X. Y.* may be used. No recognisable portrait will be reproduced without written permission from the patient or his friends.

PRESENTATION OF MS.

Papers should be submitted in typescript if possible; but carbon copies are disliked by all editors, and single spacing should not be used except for quotations. (Really accurate reproduction of quoted passages is rarely achieved, but is undoubtedly desirable.) Paragraphs that may suitably go into small print should be marked with a vertical line in the margin: these will usually include:—

1. Case-notes (which may be written tersely);
2. Descriptions of technical methods;
3. Parts of the paper that can be skipped by the ordinary reader because they are not essential to the argument;
4. Lists that require the greater prominence given by separate paragraphing. (Nos. 1–4 here are an example.)

But the use of numbered lists, reminiscent of examination answers, can certainly be overdone. Shakespeare, if a surgeon, would probably have written: "(1) To be, or (2) not to be; that is the question. Whether 'tis nobler (*a*) in the mind to suffer. . ."

Information about headings, and form in general, is best gained by studying papers already published. Two kinds of cross-heading are used in THE LANCET—the "lower case bold" and the "small caps"—but the former is ordinarily avoided except in long articles. Side-headings, unless they are headings for cases (e.g., CASE 3), are in italics, and may take one of two forms:—

Further History.—The patient went from bad to worse.

The *further history* was disappointing.

Long sections in small type can be divided by small-type cross-headings.

ITALICS

The significance of italic headings is lessened by lavish use of italics for other purposes. Subsidiary italic headings inside a paragraph are therefore inconvenient; and words like "post mortem" and "in vitro" have now become English and need no longer be treated as foreign bodies. The same applies to the everyday names of animals and vegetables, in Latin or English. In THE LANCET neither capitals nor italics are adopted in

The felidæ, and other mammalian genera, are susceptible alike to ascaris and staphylococcus.

Nor is it thought wise to apply italics to semi-slang, like *B. Pfeiffer*, which can equally well be rendered as "Pfeiffer's bacillus." But (whatever the particular classification) the proper scientific names, which give both genus and species, are always italicised, with an initial capital for the genus only and a distinguishing name added where necessary:—

Bacillus welchii; *Bacterium dysenteriæ* Flexner; *Brucella abortus* Bang; *B. paratyphosus* B.

When the generic name is first mentioned it should be spelt out (*Bacillus tuberculosis*), but afterwards the contraction *B. tuberculosis* will serve.

TABLES AND ILLUSTRATIONS

Tables, which will always be printed in smaller type, should be numbered in roman numerals and put on sheets separate from the text. The printer cannot always place them exactly where the author intends, and hence one must say "the results are given in Table VI" rather than "the results were as follows." An exception may be made for very short Tables and those that can be split without harm if they happen to start near the bottom of a column. Illustrations, too, should be kept separate from the text, being numbered consecutively in arabic numerals (Fig. 1, Fig. 2, &c.), whether they are charts, photographs, or drawings. Each Figure should have a reference in the text, and preferably a descriptive legend to be printed underneath. Since the lettering of charts and drawings often proves unsatisfactory when the illustration is reduced in making the block, the Editor is prepared to arrange for completion of illustrations whose lettering is done in pencil. When graph paper is used for charts the ruling should not be brown, red, or green, which come out black. The magnification of microscopical illustrations ought to be stated (e.g., × 150).

SUMMARIES

Conclusions and summary may often be combined. They are helpful to all but very short papers and should be carefully constructed because many readers abroad (and some at home) will look at nothing else. Here are examples of the descriptive summary (A), which is almost useless, and the informative summary (B), which will be reproduced or translated all over the world:—

A. A series of cases of food-poisoning is reported and their causation discussed.

B. Fifteen people fell ill with vomiting an hour after eating lizard soup. Skin tests showed that they were hypersensitive to lizard.

ABBREVIATIONS AND "LANCET" STYLE

Contracted forms like *T.B.*, *C.S.F.*, *R.B.C.*, *B.M.R.*, *M.L.D.* must be either eschewed or explained when first used. *Grains* and *grammes* should be spelt out in full where there is any conceivable chance of confusion; otherwise THE LANCET convention is *gr. 2* for two grains and *2·0 g.* for two grammes. Other abbreviations are:—

cm.	kg. (not kilo)	ml.
c.mm.	kv.	oz. (not ozs.)
c.cm. (not cc.)	lb. (not lbs.)	*p*H
ft.	μ	sp. g.
in. (not ins.)	mg. (not mgm.)	sq.

Dates.—Nov. 10th (not 10 Nov. or 10.xi.36). 1933–35 not 1933–5.

Numbers.—Should numerals or words be used? The best rule is that comparable numbers should be in the same form, and the two styles can sometimes be contrasted usefully—e.g., "No less than 4 of the 42 patients were under fourteen years of age." But a numeral must never begin a sentence. Nor can decimal points be left in the air: *0·5* is correct, not *·5*.

Every journal has sundry preferences or prejudices. Ours include:

Graves's disease, not Graves' or the commoner Grave's. Mg. per 100 c.cm., not mg. per cent. Per cent. not % (except in Tables). Aged, not aet. A radiogram and to radiograph, not an X ray or to X ray. Post mortem (adverb); post-mortem (adjective or, loosely, noun).

REFERENCES

Lists of references are not re quired merely as evidence or erudition. If given they must be above suspicion: to take over a reference from someone else without verification or acknowledgment is a crime. Each reference, moreover, should give the author's name and initials, the year of publication, the name of the journal cited (contracted henceforth according to the current edition of the "World List of Scientific Periodicals"), the volume (underlined), and the number of the first page of the paper. For books the place of publication is stated, but not the publisher's name. References are now made by giving in the text the name of the author and the date of publication, thus—

This is disputed (Jones 1936) but . . .

Wrong-headed as ever, Jones (1934) maintains . . .

If Jones has written more than one paper in the year they should be distinguished as *a*, *b* & *c*; and space can be saved by saying *and others* when teams of workers are quoted repeatedly.

The work of Jones (1935a) was soon dismissed (Wong, Fairbanks, Hepburn, and Loy 1936, Hulbert 1936b) and it was found that rhubarb is useless (Wong and others 1937).

The list of authors quoted is now put at the end of the article in alphabetical order; but if need be the items can be numbered so that the writer may say "it has been shown [12 14 26 53] that cows eat grass" without interrupting the text with a dozen names of little immediate interest. The following examples show the use of short rules to represent names that are repeated, and of *Ibid* to represent the book or journal mentioned in the previous line. (*Loc. cit.* and *op. cit.* are not acceptable.)

Brown, A., and Smith, B. (1939a) *J. med. Conchol.* **34**, 3000.
— — (1939b) *Ibid*, **35**, 1608.
— — and Dogsbody, D. (1940) Epidemiology for Oysters, London, p. 9.
— — — and Robinson, E. (1941) *Lancet*, **1**, 4000.
— (1942) *Ibid*, **2**, 2784.

The "World List" is published by the Oxford University Press at £3 3*s*. Contributors who have no

access to it and cannot find the abbreviation they want in the following selection are asked to give the full names of journals quoted and mark them in the margin with a pencil cross.

NAME	ABBREVIATION
Acta chirurgica Scandinavica :	*Acta chir. scand.*
Acta dermatologica (Kyoto) :	*Acta derm., Kyoto*
Acta dermato-venereologica :	*Acta derm.-venereol., Stockh.*
Acta medica Scandinavica :	*Acta med. scand.*
Acta obst. et gyn. Scandinavica :	*Acta obstet. gynec. scand.*
Acta ophthalmologica (Copenhagen) :	*Acta ophthal., Kbh.*
Acta pædiatrica (Stockholm) :	*Acta pædiatr., Stockh.*
Acta psychiatrica et neurologica :	*Acta psychiat., Kbh.*
Acta radiologica (Stockholm) :	*Acta radiol., Stockh.*
Acta rheumatologica (Amsterdam) :	*Acta rheum., Amst.*
American Heart Journal :	*Amer. Heart J.*
American Journal of Anatomy :	*Amer. J. Anat.*
American Journal of Cancer :	*Amer. J. Cancer*
Amer. Journal of Clinical Pathology :	*Amer. J. clin. Path.*
Amer. Jour. of Diseases of Children :	*Amer. J. Dis. Child.*
American Journal of Hygiene :	*Amer. J. Hyg.*
Amer. Journal of the Medical Sciences :	*Amer. J. med. Sci.*
Amer. Jour. of Obst. and Gynecol. :	*Amer. J. Obstet. Gynec.*
American Journal of Ophthalmology :	*Amer. J. Ophthal.*
American Journal of Pathology :	*Amer. J. Path.*
American Journal of Physiology :	*Amer. J. Physiol.*
American Journal of Psychiatry :	*Amer. J. Psychiat.*
American Journal of Public Health :	*Amer. J. publ. Hlth*
American Journal of Roentgenology :	*Amer. J. Roentgenol.*
American Journal of Surgery :	*Amer. J. Surg.*
American Journal of Syphilis, &c. :	*Amer. J. Syph.*
Amer. Journal of Tropical Medicine :	*Amer. J. trop. Med.*
American Medicine :	*Amer. Med.*
American Review of Tuberculosis :	*Amer. Rev. Tuberc.*
Anatomical Record :	*Anat. Rec.*
Anesthesia and Analgesia :	*Anesth. & Analges.*
Annales de derm. et de syph. :	*Ann. Derm. Syph., Paris*
Annales d'hygiène publique, &c. :	*Ann. Hyg. publ., Paris*
Annales de l'Institut Pasteur :	*Ann. Inst. Pasteur*
Annales de médecine :	*Ann. Méd.*
Annales d'oto-laryngologie :	*Ann. Oto-laryng.*
Annals of Internal Medicine :	*Ann. intern. Med.*
Annals of Medical History :	*Ann. med. Hist.*
Annals of Otology, &c. :	*Ann. Otol., &c., St. Louis*
Annals of Surgery :	*Ann. Surg.*
Annals of Trop. Med. and Parasit. :	*Ann. trop. Med. Parasit.*
Arbeitsphysiologie :	*Arbeitsphysiologie*
Archiv für Augenheilkunde :	*Arch. Augenheilk.*
Arch. f. exp. Path. u. Pharm. :	*Arch. exp. Path. Pharmak.*
Archiv für die gesamte Physiologie :	See Pflügers Archiv
Archiv für die gesamte Psychologie :	*Arch. ges. Psychol.*
Archiv für Gynaekologie :	*Arch. Gynaek.*
Archiv für Hygiene (und Bakteriologie) :	*Arch. Hyg., Berl.*
Archiv für Kinderheilkunde :	*Arch. Kinderheilk.*
Archiv für klinische Chirurgie :	*Arch. klin. Chir.*
Archiv für Ohren-, Nasen- und Kehlkopfheilkunde :	*Arch. Ohr.-, Nas.- u. Kehlk Heilk.*
Archiv für Ophthalmologie :	*v. Graefes Arch. Ophthal.*
Arch. f. Psych. u. Nervenkrankh. :	*Arch. Psychiat. Nervenkr.*
Arch. f. Schiffs- u. Trop.-Hyg. :	*Arch. Schiffs- u. Tropenhyg.*
Archiv für Verdauungskrankheiten, &c. :	*Arch. VerdauKr.*
Archives of Derm. and Syph. :	*Arch. Derm. Syph., N.Y.*
Archives of Disease in Childhood :	*Arch. Dis. Childh.*
Archives of Internal Medicine :	*Arch. intern. Med.*
Archives des maladies du cœur, &c. :	*Arch. Mal. Cœur*
Archives of Medical Hydrology :	*Arch. med. Hydrol., Lond.*
Archives médico-chirurgicales de l'appareil respiratoire :	*Arch. méd.-chir. Appar. resp.*
Archives of Ophthalmology :	*Arch. Ophthal., N.Y.*
Archives of Pediatrics :	*Arch. Pediat.*
Archives of Surgery (Chicago) :	*Arch. Surg., Chicago*
Archives of Surgery (London) :	*Arch. Surg., Lond.*
Australian and N.Z. Jour. of Surgery :	*Aust. N.Z. J. Surg.*
Beiträge zur Klinik der Tuberkulose :	*Beitr. Klin. Tuberk.*
Beiträge zur klinischen Chirurgie :	*Beitr. klin. Chir.*
Beiträge zur path. Anatomie, &c. :	*Beitr. path. Anat.*
Berliner klinische Wochenschrift :	*Berl. klin. Wschr.*
Biochemical Journal :	*Biochem. J.*
Biochemische Zeitschrift :	*Biochem. Z.*
Birmingham Medical Review :	*Bgham med. Rev.*
Bollettino di oculistica :	*Boll. Oculist.*
Bordeaux chirurgical :	*Bordeaux chir.*
Boston Medical and Surgical Journal :	*Boston med. surg. J.*
Bristol Medico-Chirurgical Journal :	*Bristol med.-chir. J.*
British Dental Journal :	*Brit. dent. J.*
British Journal of Anæsthesia :	*Brit. J. Anæsth.*
British Journal of Children's Diseases :	*Brit. J. Child. Dis.*
British Journal of Dermatology, &c. :	*Brit. J. Derm.*
Brit. Jour. of Experimental Pathology :	*Brit. J. exp. Path.*
British Jour. of Medical Psychology :	*Brit. J. med. Psychol.*
British Journal of Ophthalmology :	*Brit. J. Ophthal.*
British Journal of Physical Medicine :	*Brit. J. phys. Med.*
British Journal of Psychology :	*Brit. J. Psychol.*
British Journal of Radiology :	*Brit. J. Radiol.*
British Journal of Surgery :	*Brit. J. Surg.*
British Journal of Tuberculosis :	*Brit. J. Tuberc.*
British Journal of Urology :	*Brit. J. Urol.*
British Journal of Venereal Diseases :	*Brit. J. vener. Dis.*
British Medical Journal :	*Brit. med. J.*
Bruxelles médical :	*Brux. méd.*
Bulletin de l'Acad. de médecine :	*Bull. Acad. Méd. Paris*
Bulletin of Hygiene :	*Bull. Hyg., Lond.*
Bulletin of Johns Hopkins Hosp. :	*Bull. Johns Hopk. Hosp.*
Bulletin et mém. de la Société méd. des hôpitaux de Paris :	*Bull. Soc. méd. Hôp. Paris*
Bull. of Neurol. Inst. of New York :	*Bull. neurol. Inst. N.Y.*
Bull. Office internat. d'hyg. publ. :	*Bull. Off. int. Hyg. publ.*
Bull. de la Soc. de path. exotique :	*Bull Soc. Path. exot.*
Canadian Medical Association Jour. :	*Canad. med. Ass. J.*
Časopis Lékařův Českých :	*Čas. Lék. čes.*
Centralblatt :	See Zentralblatt
Chinese Medical Journal :	*Chin. med. J.*
Cleveland Clinic Quarterly :	*Cleveland Clin. Quart.*
Clinical Journal :	*Clin. J.*
Comptes rendus . . . Acad. des sci. :	*C.R. Acad. Sci., Paris*
Comptes rendus . . . Société de biol. :	*C.R. Soc. Biol. Paris*
Dermatologische Wochenschrift :	*Derm. Wschr.*
Dermatologische Zeitschrift :	*Derm. Z.*
Deutsche medizinische Wochenschrift :	*Dtsch. med. Wschr.*
Deutsche Zeitschrift für Chirurgie :	*Dtsch. Z. Chir.*
Deut. Archiv für klinische Medizin :	*Dtsch. Arch. klin. Med.*
Deut. Zeits. für Nervenheilkunde :	*Dtsch. Z. Nervenheilk.*
East African Medical Journal :	*E. Afr. med. J.*
Edinburgh Medical Journal :	*Edinb. med. J.*
Encéphale :	*Encéphale*
Endocrinology :	*Endocrinology*
Endokrinologie :	*Endokrinologie*
Epidem. Rep. Health Sect., League of Nations :	See Monthly
Ergebn. d. allg. Path., &c. :	*Ergebn. allg. Path. path. Anat.*
Ergebnisse d. Hyg., Bakteriol., &c. :	*Ergebn. Hyg. Bakt.*
Ergebnisse der inneren Medizin und Kinderheilkunde :	*Ergebn. inn. Med. Kinderheilk.*
Ergebnisse der Physiolgie :	*Ergebn. Physiol.*
Folia hæmatologica :	*Folia hæmat., Lpz.*
Fortschritte der Medizin :	*Fortschr. Med.*
Gazette des hôpitaux civils et militaires :	*Gaz. Hôp., Paris*
Glasgow Medical Journal :	*Glasg. med. J.*
Guy's Hospital Reports :	*Guy's Hosp. Rep.*
Gynécologie et obstétrique :	*Gynéc. et Obstét.*
Hæmatologica :	*Hæmatologica*
Helvetica Chimica Acta :	*Helv. chim. Acta*
Hoppe-Zeylers Zeitschrift für physiol. Chemie :	*Hoppe-Seyl. Z.*
Hospitalstidende :	*Hospitalstidende*
Human Biology :	*Hum. Biol.*
Hygeia :	*Hygeia, Chicago*
Hygiea :	*Hygiea, Stockh.*
Indian Journal of Medical Research :	*Indian J. med. Res.*
Indian Medical Gazette :	*Indian med. Gaz.*
International Clinics :	*Int. Clin.*
Irish Journal of Medical Science :	*Irish J. med. Sci.*
Jahrbuch für Kinderheilkunde :	*Jb. Kinderheilk.*
Jahrbuch für Psychiat. und Neurol. :	*Jb. Psychiat. Neurol.*
Japanese Jour. of Experimental Med. :	*Jap. J. exp. Med.*
Japanese Journal of Medical Sciences :	*Jap. J. med. Sci.*
Journal of Allergy :	*J. Allergy*
Journal of American Medical Association :	*J. Amer. med. Ass.*
Jour. de l'anatomie, &c. :	*J. Anat., Paris*
Journal of Anatomy :	*J. Anat., Lond.*
Journal of Bacteriology :	*J. Bact.*
Journal of Biological Chemistry :	*J. biol. Chem.*
Journal of Bone and Joint Surgery :	*J. Bone Jt Surg.*

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Journal of Experimental Medicine :	*J. exp. Med.*
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Journal of Pediatrics :	*J. Pediat.*
Journal of Pharmacology, &c. :	*J. Pharmacol.*
Journal de physiol., &c.:	*J. Physiol. Path. gén.*
Journal of Physiology :	*J. Physiol.*
Journal of the R.A.M.C. :	*Jour. R. Army med. Cps*
Journal of Royal Sanitary Institute :	*J. R. sanit. Inst.*
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Journal of Urology :	*J. Urol.*
Klinische Wochenschrift :	*Klin. Wschr.*
Lancet :	*Lancet*
Laryngoscope (London) :	*Laryngoscope, Lond.*
Laryngoscope (St. Louis) :	*Laryngoscope, St. Louis*
Leprosy Review :	*Leprosy Rev.*
Liverpool Medico-Chirurgical Journal :	*Lpool med.-chir. J.*
Lyon médical :	*Lyon méd.*
Malaya Medical Journal :	*Malaya med. J.*
Médecine :	*Médecine*
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Medical Clinics of North America :	*Med. Clin. N. Amer.*
Medical Journal of Australia :	*Med. J. Aust.*
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Medical Press and Circular :	*Med. Pr.*
Medical Record :	*Med. Rec.*
Medical Research Council :	See Special Reports
Medical World (London) :	*Med. World, Lond.*
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Medizinische Klinik :	*Med. Klinik*
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Monatsschr. f. Geburtsh. u. Gyn. :	*Mschr. Geburtsh. Gynäk.*
Monatsschrift für Kinderheilkunde :	*Mschr. Kinderheilk.*
Monthly Epidem. Rep. Health Section, League of Nations :	*Mon. epidem. Rep. Hlth Sect. L.o.N.*
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Philosophical Trans. of Royal Society :	*Philos. Trans.*
Physiological Abstracts :	*Physiol. Abstr.*
Policlinico :	*Policlinico*
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Practitioner :	*Practitioner*
Prensa médica argentina :	*Prensa méd. argent.*
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Proceedings of the Royal Society :	*Proc. roy. Soc.*
Proc. of Royal Society of Medicine :	*Proc. R. Soc. Med.*
Proc. Soc. Exp. Biol. & Med. :	*Proc. Soc. exp. Biol., N.Y.*
Proc. of Staff Meetings of Mayo Clinic :	*Proc. Mayo Clin.*
Progrès médical :	*Progr. méd., Paris*
Public Health :	*Publ. Hlth, Lond.*
Public Health Rep. (Washington) :	*Publ. Hlth Rep., Wash.*
Quart. Bulletin of Health Organisation, League of Nations :	*Quart. Bull. Hlth Org. L.o.N.*
Quart. Jour. of Exper. Physiology :	*Quart. J. exp. Physiol.*
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Verhandlungen der deutschen Gesellschaft für innere Medizin :	*Verh. dtsch. Ges. inn. Med.*
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Zeitschrift f. Immunitätsforschung, &c. :	*Z. ImmunForsch.*
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Zeitschrift für Kreislaufforschung :	*Z. KreislForsch.*
Zeitschrift für physiologische Chemie :	See Hoppe-Zeyler
Zeitschrift für Tuberkulose :	*Z. Tuberk.*
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Zentralblatt für allgemeine Pathologie u. path. Anatomie :	*Zbl. allg. Path. path. Anat.*
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Zentralblatt für Gynäkologie :	*Zbl. Gynäk.*
Zentralblatt für Hals-, Nasen- und Ohrenheilkunde :	*Zbl. Hals-, Nas.- u. Ohrenheilk.*
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